COVER SHEET – AGENDA ITEM #R3
For Commission Meeting: April 23, 2018

"Community Technology Grant Agreement: Pacific Northwest College of Art"

Recommendation
Staff recommends that the Commission approve the 2018 Community Technology Grant agreement with Pacific Northwest College of Art for $129,229.00

Background
At its January meeting, the Commission selected 8 Pre-Applications to invite to apply for funding. Following the Commission's decision, MHCRC staff engaged all 8 applicants in a process to complete full grant applications and contracts.

MHCRC staff has reached agreement on a final grant application and contract with Pacific Northwest College of Art (PNCA) and recommends approval at the April meeting. PNCA's innovative Make+Think+Code (M+T+C) is a technology-focused institute, lab, and makerspace, supporting Portland's educational, civic, nonprofit, tech and creative communities. Through M+T+C workshops, labs, hackathons, etc. the PNCA project focuses on offering video production workshops and trainings designed by and for women and people of color, two demographics often missing in the tech economy. Students engaged in the video production workshops and trainings will have the opportunity to pursue their own creative video projects but will also be tasked with videoing M+T+C labs, workshops, hackathons, and institutes (events). Specifically, the students will 1) gain career-ready video production skills, 2) be provided with opportunities to be instructed and mentored by women and people of color, and 3) gain exposure to STEAM technologies and creative careers.

There are no significant changes to the final application or the grant request.

As part of the normal grantmaking process, Comcast is given the opportunity to review all final grant applications and contracts prior to staff moving the contracts forward for Commission consideration.

Attachment: Draft Community Technology Grant Agreement: PNCA

Prepared By: Rebecca Gibbons
April 18, 2018

AGREEMENT FOR COMMUNITY TECHNOLOGY GRANT

This Agreement is between the Mt. Hood Cable Regulatory Commission (Commission), through the Office for Community Technology (OCT), and Pacific Northwest College of Art (Grantee) (together referred to as the "Parties").

RECITALS:

This Agreement is entered into for the purpose of providing the Commission's 2018 grant funds for the Grantee's Make+think+Code Community Technology Lab and Institute: Providing access to technology, expertise, trainings and workshops to support digital inclusion, connected lifelong learning and to empower a diverse community to thrive in Portland's industry Project.

AGREEMENT:

1. Grant Amount, Use of Grant

Grantee is awarded a total amount of $129,229.00 for specific capital costs related to the Grant project. Grantee shall use the Grant funds exclusively for the purposes outlined in its Grant Application (the "Grant"). The Grant Application is attached to this Agreement as Attachment 1. Grantee shall not use the Grant funds for any purposes other than those set forth in Attachment 1.

2. Project Manager

The Commission's Project Manager shall be Rebecca Gibbons or such other person as shall be designated in writing by the OCT Community Technology Program Manager.

3. Payments

Upon submission of an invoice from Grantee, and upon certification by the Project Manager that the invoice is in accordance with this Agreement, the Commission shall pay to the Grantee $129,229.00 as specified in the invoice within thirty (30) days after receipt of the invoice.

Grantee shall submit the invoice online through the Commission's online grants management system using the claims module. The invoice, uploaded as an attachment to the grants management system claims module, shall be on Grantee's letterhead, signed and dated by an authorized representative of Grantee and addressed to "MHCRC c/o City of Portland." The invoice shall include an invoice number, the title of the Grant project and the total grant amount authorized by the Grant. If the Project Manager finds that the invoice is not in accordance with this Agreement, the Project Manager shall notify the Grantee of the reason(s) for the disallowance and non-payment.

All expenditures made from Grant funds for Grant project capital costs must be made at least sixty (60) days prior to the expiration of this Agreement.

Grantee shall repay to the Commission, thirty (30) days prior to the expiration date of this Agreement, any Grant funds that have not been expended for Grant purposes.

4. Financial Records

Grantee shall account for the Grant funds separately in its books of accounts. Grantee shall

charge only Grant-related expenditures against Grant funds.

Grantee agrees to keep accurate and complete financial records that will enable the Commission to easily determine the use of Grant funds and the allocation method of Matching Funds committed by Grantee and Project Partners in the Grant for the project. Grantee shall maintain all financial records related to the Grant for one (1) year after the termination of this Agreement. Grantee shall provide the Commission prompt access to these records upon request and permit copying as the Commission may require.

5. Reports

Grantee shall submit Interim Status Reports and a Final Status Report (collectively referred to as 'Report(s)') to the Project Manager using the Commission's online grants management system. The Reports shall include both programmatic and financial information as established by the Commission. An example of the range of report information collected is attached to this Agreement as Attachment 2. For a Report to be acceptable to the Project Manager, the Grantee shall document and clearly describe the progress of the grant scope in accordance with the reporting schedule defined below.

Interim Status Reporting periods are May 1, 2018 through December 31, 2018; January 1, 2019 through June 30, 2019; July 1, 2019 through December 31, 2019. Interim Status Reports are due within thirty (30) days of the end of each reporting period.

Grantee shall submit a Final Status Report no later than July 30, 2020.

Interim and Final Status Reports shall include an accurate and complete financial report of Grant fund and Matching fund expenditures. The Report shall include copies of receipts or other evidence of payment for actual grant funded capital costs incurred by Grantee related to the Grant.

The Project Manager, at her/his sole discretion, may require additional programmatic information or financial documentation of Grant project expenditures. Grantee shall make its books, general organizational and administrative information, documents, papers and records that are related to this Agreement or Grantee's performance of services related to this Agreement available for inspection by the Project Manager or other Commission representatives during reasonable business hours following five (5) business days advance written notification from the Project Manager.

Grantee shall immediately provide notice in writing by electronic mail to the Project Manager when Grantee anticipates or realizes any deviation in the Grant project which may result in Grantee's inability to complete the Grant project as originally submitted and approved by the Commission.

6. Project and Fiscal Monitoring

The Commission and the Project Manager shall monitor the Grantee's performance on an as needed basis to assure compliance with this Agreement. Such monitoring may include, but are not limited to, on site visits at reasonable times, telephone interviews and review of required reports. Monitoring will cover both programmatic and fiscal aspects of the Grant. The frequency and level of monitoring will be determined by the Project Manager. Grantee shall remain fully responsible at all times for performing the requirements of this Agreement.

7. Audit

Because grant funds are derived from the cable franchises, the cable companies may conduct a financial review or audit of Grantee for the purpose of verifying whether use of capital grant funds is in accordance with the requirements of cable franchises related to use of capital grant funds. If the Commission receives notice from a cable company in accordance with the terms of the cable franchises of such audit or review, the Commission's Project Manager shall notify Grantee within 5 business days of receiving the notice, and shall identify to Grantee the relevant financial records of Grantee that the cable company seeks to review. The scope of such audit or review of Grantee shall be consistent with the terms of the applicable cable franchise. Grantee agrees to make such relevant financial records available to cable company's authorized representative for inspection and copying. Such records shall be reviewed during normal business hours at a time and place made available by Grantee. The Commission's Project Manager shall promptly provide Grantee with written notice of the audit or review's conclusions.

8. Publicity

Any publicity regarding the project shall indicate that the project was made possible by a Grant from the Commission through funds provided by the cable companies. Grantee shall notify the Project Manager before releasing information about the Grant to the press or other news media. The Commission may include information regarding the Grant in periodic public reports.

9. No Other Obligations/Complete Agreement

Grantee acknowledges that, except for the Grant, the Commission has no obligation to provide, and the Commission has not led Grantee to believe in any way (whether expressly or by implication) that the Commission will provide any additional or future assistance, financial or otherwise, either to Grantee or for the Grant project.

This Agreement contains the complete agreement of the parties. This Agreement may not be assigned, nor may any of the Commission's rights be waived, except in writing signed by a duly authorized representative of the Commission. The Commission may specifically enforce, or enjoin a breach of, the provisions of this Agreement, and such rights may be freely assigned or transferred to any other governmental entity by the Commission.

10. Representations

Grantee represents that it has full power and authority, and has obtained all necessary approvals, to accept the Grant, to carry out the terms of the Grant and this Agreement, and to conduct the Grant project in compliance with all applicable laws.

11. Indemnification

Subject to the limitations and conditions of the Oregon Constitution, Article XI, Sections 7 and 9, and the Oregon Tort Claims Act (ORS 30.260 through 30.300), the parties agree to indemnify and hold one another harmless from any loss, damage, injury, claim, or demand arising from their respective activities in connection with this Grant. Neither party shall be liable for any loss, damage, claim, or demand arising from the negligence of the other party or its agents or employees.

12. Compliance with Laws

The Commission and Grantee agree to comply with all applicable local, state and federal laws and regulations that apply to the subject matter of this Agreement.

13. Amendment

The Project Manager is authorized to amend the terms and conditions of this Agreement, provided such changes do not increase the Grant amount or the Commission's financial risks or change the purpose of the Grant. If approved such amendments shall only be effective if in writing, and signed by duly authorized representatives of both Parties. Any change in the amount of the Grant funds or the financial risks under this Agreement must be approved by vote of the Commission.

14. Term of the Agreement

This Agreement becomes effective on May 1, 2018, unless Grantee fails to sign and return the Agreement to the Commission within thirty (30) days of Commission action to approve the Agreement, in which event this Agreement shall be null and void. The term of this Agreement is through, and including, September 30, 2020.

15. Early Termination of Agreement

This Agreement may be terminated prior to the expiration of its term by:

(a) Written notice provided to Grantee from the Commission before any obligations are incurred; or

(b) Mutual written agreement of the Parties.

Termination of this Grant shall be without prejudice to any obligations or liabilities of either party already accrued prior to such termination. However, upon receiving a notice of termination, Grantee shall immediately cease all activities under this Grant, unless expressly directed otherwise in writing from the Commission in the notice of termination. Further, upon termination, the Commission and/or Grantee shall deliver to the other party all works-in progress and other property that are or would be deliverables had the Grant been completed. Grantee shall be entitled to receive reasonable compensation as provided for under this Agreement for any satisfactory work completed up until the time of notice of termination.

16. Material Failure to Perform

The Project Manager may terminate this Agreement after determining that Grantee has failed to comply with any material term or condition of this Agreement. It shall be a material breach and cause for termination of this Agreement if Grantee uses grant funds outside the scope of this Agreement.

Notice and Opportunity to Cure. The Project Manager shall give Grantee written notice of the intent to terminate this Agreement, identifying the reasons for such action. Grantee shall have thirty (30) days from the date of the written notice to cure the breach. If the breach is of such nature

that it cannot be completely cured by Grantee within the thirty (30) day period, then Grantee shall submit a cure plan to the Project Manager no later than fifteen (15) days from the date of the written notice. Grantee's cure plan shall include actions, steps, and a time period to cure the breach. Grantee must obtain written consent from the Project Manager to proceed with a cure plan under an extended cure period.

No Payment During Cure Period. During the cure period or extended cure period, the Commission is under no obligation to accept or pay invoices submitted by Grantee under this Agreement. Grantee shall not perform services or take actions that would require the Commission to pay grant funds to Grantee without the written consent of the Project Manager. Grantee shall not spend unused grant funds and such unused funds shall be solely held in trust for the Commission. Grantee shall be solely responsible for any expenses associated with cure of its noncompliance or failure to perform.

Cause for Termination. If Grantee fails to cure the material breach within thirty (30) days of the written notice of termination, or if Grantee does not receive consent from the Project Manager to proceed with a cure plan and executes the cure plan satisfactory to the Project Manager, then the Commission may, at its sole discretion, require Grantee to refund to the Commission any amounts improperly expended, any unexpended amounts or the full amount of Grant funds paid by the Commission to Grantee for the Grant project in compliance with the terms and conditions of this Agreement.

17. Suspension of Work

The Project Manager may at any time give notice in writing to Grantee to suspend work and expenditure of funds provided under this Agreement. The notice of suspension shall specify the date of suspension and the estimated duration of the suspension. Grantee shall immediately suspend work and expenditure of funds to the extent specified. During the period of the suspension Grantee shall properly care for and protect all projects in progress including materials, supplies, and equipment that are on hand for performance of the Grant. The Project Manager may, at any time, withdraw the suspension of work as to all or part of the suspension in written, by electronic mail, notice to Grantee specifying the effective date and scope of withdrawal. Grantee shall then resume diligent performance of the work. In no event shall Grantee be entitled to any incidental or consequential damages because of suspension.

The causes for suspension of work include, but are not be limited to, Project Manager's concerns about Grantee's ability to complete the Grant in accordance with this Agreement or any other non-compliance with the Agreement.

18. Non-Discrimination

In carrying out activities under this Agreement, Grantee shall not discriminate against any employee or applicant for employment on the basis of race, color, religion, age, sex, marital or economic status, familial status, national origin, sexual orientation, disability or source of income. Grantee shall take actions to insure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, age, sex, marital or economic status, familial status, national origin, sexual orientation, or disability. Such action shall include but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Grantee shall state that all

qualified applicants will receive consideration for employment without regard to race, color, religion, age, sex, marital or economic status, familial status, national origin, sexual orientation, disability or source of income. In regard to carrying out activities under this Agreement, Grantee shall further not arbitrarily refuse to provide services to any person and shall not discriminate in offering services on the basis of race, color, religion, age, sex, marital or economic status, national origin, sexual orientation, disability or source of income.

19. Severability

Commission and Grantee agree that if any term or provision of this Agreement is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the Parties shall be construed and enforced as if the Agreement did not contain the particular term or provision held to be invalid.

20. Choice of Law and Choice of Forum

This Agreement shall be construed according to the laws of the State of Oregon, without regard to its provisions regarding conflict of laws. Any litigation between the Commission and Grantee arising under this Agreement or out of work performed under this Agreement shall occur, if in the state courts, in the Multnomah County court having jurisdiction thereof, and if in the federal courts, in the United States District Court for the State of Oregon.

21. Survival

As of the date of termination of this Agreement, any pre-existing unresolved claim or dispute by either Party, including but not limited to, money owed, performance due, or any other obligations of the Parties, that is the result of the other Party's performance or non-performance, will, by their terms, survive termination of this Agreement and will be resolved in accordance with the terms and conditions of this Agreement. All indemnity and unperformed obligations will survive termination of this Agreement. The obligation under Section 5 to submit a Final Report shall also survive termination of this Agreement.

22. Assignment

This Agreement or any interest therein may not be assigned or subcontracted without the prior written consent of the Project Manager. In the event of transfer without prior written consent, the Commission may refuse to carry out this Agreement with either the transferor or the transferee and yet retain and reserve all rights of action for any breach of contract committed by Grantee.

Notwithstanding Grantee’s use of any subcontractor for performance of this Agreement, Grantee shall remain obligated for full performance hereunder, and the Commission shall incur no obligation other than its obligations to Grantee under this Agreement. Grantee agrees that if subcontractors are employed in the performance of this Agreement, the Grantee and its subcontractors are subject to the requirements and sanctions of ORS Chapter 656, Workers’ Compensation.

23. Electronic Means

The parties agree the Commission and Grantee may conduct this transaction, including any contract amendments, by electronic means, including the use of electronic signatures.

24. Notice

Any notice provided for under this Agreement shall be sufficient if in writing and (1) delivered personally to the following addressee, (2) deposited in the United States mail, postage prepaid, certified mail, return receipt requested, (3) sent by overnight or commercial air courier (such as Federal Express), or (4) email addressed as follows, or to such other address as the receiving party hereafter shall specify in writing:

If to the Commission:
Attn: Rebecca Gibbons, Project Manager:
Mt. Hood Cable Regulatory Commission
c/o City of Portland/ OCT
PO Box 745
Portland, OR 97207-0745
Email: rgibbons@mhcrc.org

If to Grantee:
Attn: Nandini Ranganathan
Pacific Northwest College of Art
511 NW Broadway
Portland, OR, 97209
Email: nandini@pnca.edu

Any such notice, communication or delivery shall be deemed effective and delivered upon the earliest to occur of actual delivery, three (3) business days after depositing in the United States mail as aforesaid, one (1) business day after shipment by commercial air courier as aforesaid or the same day an email transmission is sent (or the first business day thereafter if sent on a Saturday, Sunday or legal holiday).

AGREEMENT FOR COMMUNITY TECHNOLOGY GRANT: Make+think+Code Community Technology Lab and Institute: Providing access to technology, expertise, trainings and workshops to support digital inclusion, connected lifelong learning and to empower a diverse community to thrive in Portland's industry

GRANTEE: Pacific Northwest College of Art

BY:_____Date:_____

Name:_____

Title:_____

MT. HOOD CABLE REGULATORY COMMISSION SIGNATURES:

By: _____ Date: _____
Mt. Hood Cable Regulatory Commission Chair

Approved as to Form:

By: _____ Date: _____
Mt. Hood Cable Regulatory Commission Attorney

Application

00738 - 2018 Community Technology Grants - Final Application

00885 - Make+think+Code Community Technology Lab and Institute: Providing access to technology, expertise, trainings and workshops to support digital inclusion, connected lifelong learning and to empower a diverse community to thrive in Portland's industry.

Community Technology Grants

Status:	Submitted	**Original Submitted Date:**	03/15/2018 3:56 PM
		Last Submitted Date:	04/18/2018 1:14 PM

Applicant Information

Primary Contact:

Name:	Salutation	Nandini First Name	Middle Name	Ranganathan Last Name
Email:*	nandini@pnca.edu			
Phone:*	503-821-8908 Phone			Ext.
Title:	Founder/Executive Director			

Organization Information

Organization Name:*	Pacific Northwest College of Art		
Organization Type:*	Non-Profit Entity		
Tax ID	93-1139187		
Organization Address:*	511 NW Broadway		
City*	Portland City	Oregon State/Province	97209 Postal Code/Zip
Phone:*	503-821-8950		

Executive Summary

Executive Summary

The Executive Summary is your opportunity to introduce your project.

We are at the beginning of a new era of technical innovation and we need a model of education that connects education to careers, and that helps a diverse community of learners adapt to a world of increasingly complex technology-focussed work. STEAM and fluency with emerging technologies are essential 21st Century skills needed to prepare our youth and professionals for the careers of the future.

Technology-related curriculum and resources are often limited to higher-income schools resulting in disparities in access that marginalize many already under-represented groups. Additionally, there are limited resources available for retraining, for entering STEAM educational and career pathways if one did not enter this pipeline early on. Technology and design education is expensive, and students are deterred by the lack of diverse role models. Women and people of colour often find current curriculum and ways of teaching rather distancing, and fewer opportunities to engage in creative ways of learning new creative and emerging technologies. Fields like video production and other creative technologies (virtual reality) in particular have very few women involved.

Make+Think+Code at PNCA will design and offer video production workshops and trainings. The workshops and trainings are open to the public, however we will employ targeted recruitment strategies in order to ensure that at least 40% of the students enrolled are women and/or people of colour. Through the workshops and trainings, students will 1) gain career-ready video production skills, 2) be provided with opportunities to be instructed and mentored by women and people of colour, and 3) gain exposure to STEAM technologies and creative careers.

The project will fund technology to create video content of our M+T+C events to show on community access channels as well as online. It will also capture video of diverse students showcasing creative uses of technology. The M+T+C events are designed to reflect skills relevant to careers in our creative technology industries, and will prepare students for success in STEAM educational and career pathways. We anticipate producing at least 5 event videos, from a selection of 100 M+T+C events, as well as at least 10 short (5 -10 minute) video presentations showcasing emerging technologies.

We have chosen technology that are relevant to today's STEAM careers and exciting for young adult learners. We will use the workstations, and technology funded by the grant for video production in the lab. We will enroll under-represented groups in the video production program (specifically targeting women and people of color). Once distributed to the Open Signal, viewers of our programming will gain access and exposure to STEAM related educational opportunities, see role models that reflect their backgrounds, and be inspired to participate.

We will create programming that is relevant to a diverse community of learners. In addition to our video workshop students, at least 40% of our STEAM workshop participants will be from communities under-represented in STEAM/design. We will also increase the diversity of our faculty/mentors by 10%. M+T+C already has relationships with community STEAM groups and will collaborate with them and new partners (communities in East County and North Portland) to recruit under-represented communities of students and educators for our workshops and will work with them to publicize the videos in the communities that they serve. Our industry partners are excited to engage in an effort that will develop a diverse and inclusive talent pool fluent in technology.

We look forward to engaging and broadening the audience of the community access channels, inspiring local communities to more deeply engage with creative technology career paths. We further hope to have a chance to engage these communities in person in the lab and in our workshops, and are excited to diversify the Make+think+Code community through this project.

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Project Narrative

Total Grant Funds:	$129,229.00
Total Match Funds:	$424,515.00
Total Funds:	$553,744.00
Cable System Technology Use	Community Access Channels
Proposed Technology	Video production equipment
Public Benefit Area	Reducing Disparities for Underserved Communities

Project Purpose

In defining the project purpose, applicants must:

- *Define a specific need or problem. This includes clearly defining the community or beneficiaries you intend to impact.*
- *Propose a credible solution and achievable means of addressing identified needs or problems. Specifically, how will the use of the technology address your identified public benefit area? One way of describing this interaction is to offer a "real life" scenario of how the services would be used and how that use would address the community's or beneficiaries' needs. You should specifically describe how use of the community access channels and/or the I-Net supports the proposed project in addressing the identified needs or problems.*
- *Identify realistic, measurable outcomes that you expect to result from implementation of the project.*

The Problem / Need / Issue:

We are at the beginning of a new era of technical innovation and we need a model of education that connects education to careers and helps learners adapt to a world of increasingly complex technology-focussed work. Fluency with emerging technology and digital storytelling (including video production) are essential 21st Century skills needed to prepare our youth and professionals for the careers of the future. We must increasingly help a diverse community of learners develop skills that are vital to the workplace.

Our current programs to teach technology/STEAM have not adapted their pedagogy to include a diversity of learning styles, ages, and communities and have not used available technology to meet this need. Academic programs have not yet adapted their pedagogy for a diverse audience, and existing models don't offer adequate opportunities for teaching by professionals. In particular, women and people of colour often find current curriculum and ways of teaching rather distancing, and are offered fewer opportunities to engage in creative ways of learning new and emerging technologies. Fields like video production and other creative technologies (virtual reality) in particular have very few women involved, especially in positions of leadership. This leads to less innovative methods of using video and sound to tell impactful stories relevant to a diversity of audiences.

Women and people of color are deterred from engaging in technology/STEAM educational opportunities because of the lack of diverse role models. Research shows that students are much more likely to engage with a STEAM subject if they find faculty and mentors that are from their communities and share their experiences. Post-secondary education institutions have very restrictive academic credentialling requirements for their faculty that perpetuate a lack of diversity among faculty and a lack of access to diverse role models and mentors for students.

A recent opinion in the NYT titled “Lost Einsteins” describes "Much of human progress depends on innovation. It depends on people coming up with a breakthrough idea to improve life. ... For this reason, societies have a big interest in making sure that as many people as possible have the opportunity to become scientists, inventors and entrepreneurs. ... Women, African-Americans, Latinos, … and low- and middle-income children are far less likely to grow up to become patent holders and inventors. Our society appears to be missing out on most potential inventors from these groups.”

Current technology-related curriculum and resources are often limited to higher-income schools (high schools and post-secondary), resulting in disparities in access that marginalize many already under-represented groups. Research indicates that a disparity of access to learning resources between children of affluence and those in poverty has created a knowledge gap with serious implications for students' economic prosperity and social mobility. This impact is particularly felt in communities of colour, native Americans and immigrants.

We developed the proposed program through ongoing conversations, focus groups, and brainstorming sessions with stakeholders (students and educators) in the k-16 system, as well as industry partners in technology/design, nonprofits, meetup groups in STEAM in Portland (Women WHo Code, Portland R Meetup, Portland 3D Printing Lab, Hack Oregon, New Tech PDX, Design Reality) and community groups including the HIVE Cascadia members (incl. Rockwood Library Makerspace and Multnomah County Library).

The Solution: Make+Think+Code: An Inclusive Model for Learning Creative Technologies

We propose a new model of learning --- one that is affordable, supports lifelong learning, and includes a diverse community of learners, especially women and people of colour, who are significantly under-represented in creative technology fields like video production.

This proposed video program provides exactly such a model. We will train a diverse group of students to design, create, edit, and produce videos. We will develop video production workshops and trainings that use more innovative curriculum, collaborative projects, experimentation and emerging technologies in order to meet the diverse learning styles of the students.

The primary beneficiaries are people under-represented in video production/STEAM careers, particularly women and people of colour. We anticipate that at least 40% of the students enrolling in the video production workshops and training programs will be women and/or people of colour. Our video production workshops and trainings will focus on creating supportive collaborative environments emphasizing peer-learning and mentoring. Students will work/learn with professionals, creating their own unique videos and videos of our M+T+C events (i.e. labs, hackathons and festivals). Our workshops will encourage students to explore their own ideas, develop new skills, and build confidence in themselves through the use of technology. Our mission for these programs is to inspire students from underserved communities to develop fluency in technology and become self-motivated and confident learners through hands-on, participatory experiences that make learning relevant, impactful, and exciting.

Students engaged in the video production workshops and trainings will have the opportunity to pursue their own creative video projects but will also be tasked with videoing our M+T+C lab, workshops, hackathons, and institutes (events). These events feature a myriad of technologies, software, design, prototyping, and fabrication workstations, ets. that foster discovery and invention and include classes on creative coding, digital design (for 2D and 3D, games, and augmented/virtual/mixed realities, xd, motion graphics, and visual effects), electronics and smart technology, rapid prototyping and fabrication, wearable technology, data science, blockchain/privacy and security, and artificial intelligence. These events will provide hands-on opportunities for learning, mentoring, and experimentation as well as offer new models of pedagogy and curriculum more able to adapt to the needs of a broader much more diverse community of learners. The event videos will capture underrepresented groups teaching and learning STEAM, creating a greater diversity of role models for our youth/viewers. We anticipate producing at least 5 event videos, from a selection of 100 M+T+C events, as well as at least 10 short (5 -10 minute) video presentations showcasing emerging technologies.

We will recruit students with help from community partners and our recruitment will emphasize women and people of colour and those with less access to or confidence in creative technologies. We will also ensure that we have a diverse set of instructors and mentors.

We will upload the event videos to the community access channels as well as to YouTube/Vimeo and share on our website and social media to encourage and excite the broader community to get involved.

Throughout our workshops we strive to create a place for peer-based learning, where people learn with and from one another, where thinking is integrated with doing and making, in collaboration with other people. We support a creative and safe learning environment where learners engage in meaningful exploration, invention, self-discovery, and collaboration through STEM, digital media, and the arts.

We will make every effort to ensure that our videos are creative and inspiring to a diverse audience. We look forward to engaging and broadening the audience of the community access channels, inspiring local communities to more deeply engage with creative technology career paths. We further hope to have a chance to engage these communities in person in the lab and in our workshops, and we are excited to diversify the Make+Think+Code community through this project.

Teaching and Learning Philosophy: Our philosophy of learning is deeply influenced by Seymour Papert and Mitch Resnick at the MIT Media Lab who introduced the concept of Lifelong Kindergarten - emphasizing hands-on exploration, investigation, joy, and love of learning characterized in the early childhood classroom. They emphasized the importance of the 4 Ps: getting students to work on projects, based on their passion, in collaboration with peers, in a playful spirit. Working on projects gives you an understanding of the creative process - to start with just the inkling of an idea, to build a prototype, share it with people, experiment with it, and continue to modify and improve it. People are going to make deeper connections to the content when they are passionate about the ideas, and when they're learning with and being inspired by peers. This model for learning which we will emphasize in our workshops and in our video production trainings, includes a greater diversity of learners.

Student Recruitment

We specifically intend to engage communities in East County and North Portland that lack resources and support to engage with STEAM. We have working relationships with community groups such as East Metro STEAM Partnership, Portland Metro STEM Partnership, New Avenues, NW Noggin, TiE Young Entrepreneurs, Pixel Arts and Breaker Foundation and have been talking with Portland Youth Builders, N/NE Steam Coalition, PeAR, to recruit students for our workshops, trainings and lab events. We will also request their help to publicize the videos to their networks and the communities that they serve.

Instructor and Mentor Recruitment

Make+Think+Code already has established relationships with creative technology industry partners (for example, W+K, Intel, Uncorked Studios, Periscopic, Instrument, Second Story, Helios Interactive, Puppet, and many others). Our industry partners are excited to engage in an effort that will develop a diverse and inclusive talent pool and workforce fluent in technology, and to provide opportunities for teaching and upskilling for their current employees, helping develop leadership and confidence. This could help create a more collaborative inclusive network in creative technology across businesses and provide support, networking and mentoring opportunities for under-represented groups in these fields. We plan to work with companies that signed the TechTown Diversity pledge, Latino Startup network, PIE (Portland Incubator Experiment), and PitchBlack, to find inspiring and dedicated mentors and instructors. We believe the teacher is a catalyst for inspiration and connection, but is also a collaborator, working together with students on projects.

Specifically, we will engage with at least 10 area nonprofits and civic groups, as well as creative/tech industry firms, that serve groups under-represented in STEAM and design. We will encourage their members to use the lab, to participate in our workshops and trainings, and serve as mentors and instructors.

Mentoring Model:

We will have staffed open hours during which students can practice what they have learned or work on self-guided projects using skills that they have mastered. This time and space also provides opportunities for peer-to-peer collaboration and instruction. When people collaborate with others of diverse ages, cultures, genders, and backgrounds, they gain new perspectives for understanding the world - and themselves. We strive for a safe and inclusive learning environment where everyone's ideas and opinions are respected - we find that this builds confidence to take risks and experiment - and thus they are more likely to learn and innovate.

We also allow our members (faculty, mentors, students and community partners) access to the lab during unstaffed hours. Our space is a do-it- yourself laboratory, designed to facilitate creation, invention and innovation. Learners who are constantly exploring, experimenting, and testing the boundaries develop the creative confidence needed to come up with most innovative ideas and creative new directions.

Examples of M+T+C workshop events we intend to offer include:

Video Production: Emphasizing the ability to tell impactful stories digitally, using innovative cutting edge- visual effect, using non-traditional screens, creating interactive experiences, and emphasizing the collaborative nature of creative technology projects.

Creative Coding: Very few people grow up to be professional writers, but we teach everyone to write because it's a way of communicating with others - of organizing your thoughts and expressing your ideas. The reasons for learning to code are the similar - you learn how to break complex problems into simpler parts. You learn how to identify problems and debug them. You learn how to iteratively refine and improve designs over time. You learn to express, and share ideas in new ways, in a new medium, one that is more familiar to our youth.
In today's society, digital technologies, coding, and apps are a symbol of possibility and imagination. When youth learn to use digital technologies to express themselves they begin to see themselves in new ways and to develop a confidence essential for success.

Visual Effects: Visual Effects is a new and growing educational and career path that uses emerging technologies to create a powerful an imaginative blend of creativity, design and software/technology. This workshop will include creating visual effects on surfaces and space using Projection Mapping and live video performance.

Digital Fabrication: As more and more of our manufacturing is now using computer-aided design and controls, it becomes essential to learn these technologies to engage in engineering, industrial/product design and manufacturing industries and careers. The workshops will also include trainings and workshops designing for and using the Laser Cutter, Vinyl Cutter, plotters, 3d printers, cnc routers, sewing machines.

Electronics, Smart Technologies and the Internet of Things: as more and more of our devices become "smart" and are networked, it is essential to engage with the science, technology and design of these devices. Learning about such devices involves an understanding of how they use sensors, microcontrollers and wireless/bluetooth technology to interact and communicate. The workshops will include multiple options of working with circuits, sensors and microcontrollers (arduinos, teensy, makey-makey), building computable devices (with raspberry pis) including microscopes, video players, synthesizers, creating wearable technology.

Emerging Technologies: Curriculum related to current and emerging technologies (as well as expertise and the technologies themselves) are rare and expensive and often inaccessible. A most important component of what we do is bring access to this content.

Making Learning Visible: We will periodically showcase student during events (such as the Portland Winter Light Festival, Design Week Portland, project showcases, and hackathon presentations), on our website, on social media, and through these videos and presentations that this project will fund. Presentation of participant work gives students the chance to build a portfolio for career success, in addition to allowing others to appreciate their creativity.

Outcomes

At least 40% of the students enrolled in the video production workshops and trainings will be from under-represented groups, particularly women and/or people of colour. All students enrolled will gain relevant video production and editing skills and exposure to STEAM technologies/creative careers.

At least 40% of the participants enrolled in our M+T+C events will be from communities

under-represented in STEAM/design fields. This includes women/girls, people of color, immigrants, first generation college students, native students, English language learners, LGBTQ communities, people with learning and physical/mental disabilities, and low-income communities.

We will increase the diversity (number of women and/or people of colour) of our faculty/mentors by at least 10%.

We will create videos of at least 5 workshops and trainings as well as at least 10 short (5 -10 minute) video presentations/animations for broadcast through Open Signal's and Metro East Community Media's channels. The content will focus on STEAM and emerging technologies relevant to CTE-STEAM career pathways and industries in Oregon. In addition, we will create and upload these videos to our YouTube account and publicize them on our website and social media channels for broader viewership and distribution.

Make+Think+Code will offer 100 workshops, trainings and demos focused on creativity, making, emerging technology and fabrication enrolling 500 participants and generating 100 visitors to the lab.

In conclusion, grant funding will facilitate Make+Think+Code's mission of nurturing a diverse community of lifelong learners and inventors, providing opportunities, skills,and inspiration for impactful and exciting educational pathways and careers, in science, technology, engineering, mathematics, art and design. Our local creative and technology industries need a diverse community of risk-takers, creative thinkers and inventors. Make+think+Code through this project will support both our need for a vibrant, relevant inclusive educational system that serves communities under-served in STEAM and our need for a strong diverse local talent pool in creative technology especially video production.

(This field has a character limit of 30000)

Evaluation Plan

How will you evaluate progress toward and achievement of the project's anticipated outcomes?

The evaluation plan should include evaluation questions, strategies or methodologies to collect data in order to answer the questions and steps to document findings and lessons learned.

We will evaluate our progress towards the identified outcomes with a variety of quantitative and qualitative tools/data points.

Video Workshop and Training Students

- We will assess video workshop and training relevance, and satisfaction through student evaluation surveys. We will inquire about their increased interest in STEAM-related education or career pathways; their confidence in engaging with technology, and whether the workshops helped them develop relevant career skills (fluency with design-thinking and new technologies, and their experience with opportunities for networking/new collaborations.
- We will track video production workshop and training enrollment and demographics (i.e. gender, ethnicity/race, language(s) spoken at home, highest level of education obtained, income level, etc.)
- We will track usage of the lab and the technology.
- We will document resulting projects on online and track sharing and views
- We will measure how many students enrolled in multiple workshops or events; how many visited the lab to continue projects; and how many expressed interest in mentoring, residency, and teaching opportunities.
- We will collect testimonials from and interviews with community partners and students to document impact and stories of resulting collaborations.

M+T+C participants

- We will create and implement student surveys to monitor interest, relevance, and impact of our workshops and programming. We will modify our current workshop evaluation based on feedback for future workshops, for trainings, and for partner communities using the lab.
- We will track M+T+C event registrations and demographics (and repeat visits to labs and events
- We will pilot at least one workshop (virtual/augmented reality) and one training (design) in Spanish and assess whether in 2 years, we will be in a position to create workshops and trainings in at least 3 of Portland's main languages.

Instructors and Mentors

- Staff bios and surveys will help us track the number of faculty/mentors who identify as under-represented groups.

- We will track the number of community partners and collaborators (from industry, nonprofits, local and city government, community groups, and art/design studios) that engage in mentorship.

Community Input

- We will carry out surveys and brainstorming sessions with partners to assess relevance of our programming, to get ideas for future workshops and technologies relevant to their communities, and to evaluate whether participation in our activities have provided opportunities for their communities in STEAM-related pathways, opportunities for advancement within their careers, and opportunities to have a stronger role in solving problems relevant to their community/industry.
- We will track new partnerships and collaborations with schools and community organizations that help us recruit under-served students.
- We will work with our partners to find and document individual stories of projects and experiences as a result of engagement with Make+Think+Code. This will help us inspire a more diverse community to engage with STEAM.

We will create reports of this data and assessment (including our questions, raw data, analysis and a summary) three times a year to measure progress, to course-correct and adapt as needed, and to share with partners for feedback to succeed in the overall project goals. We will also create testimonials, individual (people and projects) examples of success, as well as at least 2 relevant case studies by the end of the duration of the project. We also hope to create a report that outlines ideas for adaptability and scalability for the future, and future goals to continue our mission after the project.

Potential Student Evaluation Questions

- The content of this course was valuable to my knowledge, skills, professional development and creative practice.
- The instructor's expertise and teaching style contributed to my appreciation and understanding of the content.
- This workshop inspired me to to engage more deeply with creative technology related education and career pathways and to experiment with the strategies that we learned.
- I would recommend this class to others.
- The Make+Think+Code lab, technology, and community supported my ability to succeed in this workshop.
- Summarize your experience in one short sentence.
- Would you be interested in engaging with M+T+C beyond workshops. (hackathons, mentoring, project support, leading STEAM workshops, teaching)

(This field has a character limit of 8000)

Project Partners

A "Project Partner" is defined as an organization that supplies cash or in kind resources and/or plays an active role in the planning and implementation of the project. You should present who your Project Partners are, their respective roles in the project, and specific contribution each partner will make to the project in the form of financial support, equipment, personnel, or other resources.

Our Project Partners include:

PNCA commits to providing all the support for the project.

While not included as committed project partners, we anticipate leveraging our existing relationships with outside community organizations and industry partners to:

- help recruit students and faculty for our workshops and mentors for the lab.

- help recruit new partners and collaborators.

- help fuinding in-kind donations of technology.

- help brainstorming what kinds of tehcnology and workshops we need.

- help find volunteers (participants and advisors) for our events, hackathons, and research projects.

(This field has a character limit of 4000)

PROJECT FEASIBILITY SECTION includes: Technical Design, Implementation Plan, Organizational Capacity and Project Budget (see Final Application Budget form)

Technical Design

The Technical Design should specify in detail the proposed technology and equipment to be employed; the rationale in selecting the particular technology; how the technical design supports the project's use of the community access channels and/or the I-Net; and the plans for maintaining and upgrading the system or equipment in the future.

Technical Design

The Video Production/Creative Technology/and Digital Storytelling Workshops, Trainings and Lab

The Equipment Tab in our attached Budget specifies in detail the proposed technology and equipment we intend to employ in this project. This list of equipment was developed after conducting extensive research into the types of equipment (hardware and software) used in video production, other makerspaces, fabrication/new media labs, experience/interaction design agencies and technologists. We investigated what was appropriate for recording, editing, producing the video/audio for broadcast on the community access channels.

We learned that much of the relevant and current technologies and methodologies used in our creative tech industry were too new to be included in existing curriculum (k-12 and postsecondary) and there were few opportunities for learning, retraining and few opportunities to work with experts with professional expertise. We recruited some potential faculty/mentors and developed (through many planning sessions) principles of curriculum and pedagogy that we have piloted in workshops and intend to refine and offer in this project. We determined the technology based on the content of the workshops, and what would be most useful to people who use the lab for the digital storytelling and video production. We will continue these conversations as our project evolves, ensuring that our workshops adapt and the content changes to meet the needs of our local industry (to prepare a diverse workforce to succeed) and a changing diverse community of lifelong learners.

However, the goal of our workshops and programming is not to disseminate skills based on technology as technologies very quickly become obsolete. Our goal is to empower a diverse community to develop the confidence and fluency to use a variety creative and technology-based strategies as powerful tools in collaborative problem-solving, invention, and innovation. We want to provide access to expertise in smart technologies, coding, digital fabrication and design, data science, virtual/augmented reality, and artificial intelligence to the broadest communities to create a culture where we include our entire community in problem-solving resulting in the best and most imaginative solutions and inventions. We find encouraging making as a process for learning, and an interplay between the physical (and old) with the digital (and new) technologies can lead to magical insights.

We have chosen technology, tools, and content that is current, exciting and inspiring, and will allow for complete and excellent projects, and facilitate the production of videos for broadcast on community access channels. We have the staff, faculty, and community to help us with training for the video production, and will be in close conversations with Open Signal and Metro East Community Media.

We are confident based on feedback that our approach is feasible and our past experience has shown early success. Our staff, residents, faculty will help us maintain and update the equipment, and will also make suggestions for new technologies in an ever-changing rapidly evolving digital and networked world. We intend to continue to look for technology donations, sponsors and grant funding for future technology. This funding allows us to refine our model and our content for what is best-suited to our under-represented communities in STEAM, and what is most appropriate to generate an excellent talent pool for our local creative technology industries.

Video Recording And Community Access Channels:

Through careful research and conversations with video recording/editing agencies, artists, and studios, as well as our Media Resource and Video and Sound faculty, students, and alums, and Open Signal, we created a list of equipment and software essential for ensuring that we have the technical capacity to produce excellent and relevant videos for our community access channels.

The infrastructure buildout (wiring, electrical outlets and network ports, building struts and trusses) will facilitate the video recodring - allowing us to rig up cameras, lighting, mics and recording equipment where they can capture the various technologies (laser cutter, vinyl cutter, virtual reality stations, workshop space) and projects appropriately.

Our mediatheque has additional equipment on loan from Open Signal that allows us to record/stream content. Our Media Resource Department of IT has people trained by Open Signal to produce the quality of videos needed to upload on the community access channel and they will work with us and train the Make+Think+Code Program Coordinator as well as some residents, fellows, and student assistants to assist in this process. We are excited by this as this in itself provides an educational experience in creative technology. We have observed a significant lack of diversity (especially in gender) in video production and are excited to develop a more diverse community expertise in this area.

We will work closely with Open Signal and Metro East Community Media to plan a schedule for distributing the workshop videos over the duration of the project and to ensure that the fidelity and quality is within the parameters that they are looking for for their channels.

Proposed Project Start and End Date:

Projects may include timelines of up to 36 months.

Proposed Start Date (month/year)	May 1, 2018
Proposed End Date (month/year)	June 30, 2020

Implementation Plan

The Implementation Plan should include major tasks and milestones in addition to detailed tasks needed to successfully implement the project.

The implementation plan assumes a 25 month project period from May 1, 2018 - June 30, 2020.

May 1, 2018: Project commences. Make+Think+Code Executive Director works with PNCA's IT and Facilities Departments to plan and schedule infrastructure (wiring, trusses, network ports) construction.

May 2018: Make+Think+Code Executive Director, Program Coordinator, and faculty meet to brainstorm and plan workshops for the project duration (particularly for Fall 2018) based on feedback form pilot workshops in Spring 2018

June 2018: Equipment and technology ordered and installed. Initial training in video recording and editing underway. Design relevant inclusive curriculum in video production to be offered as workshops and trainings to a diverse community.

July, August 2018: Work on outreach and recruitment, curriculum development, and partner relations for video production workshops and trainings. Recruit more faculty, ideally form under-represented communities that the grant hopes to serve (esp. women and people of colour). Initial assessment tools (surveys, databases) developed.

August 2018: Continue to train staff in video recording and editing. Recruit a diverse community of artists and technologist fellows to support students wokring on projects in the Fall.

August 2018: Update/formalize surveys and forms for evaluation, and to collect demographic informations.

September 2018- May 2020: Offer workshops, trainings, and institutes emphasizing video production, digital storytelling, that focus on current and emerging technologies, that will train a local community to be prepared for and interested in STEAM career and education pathways in local and regional creative technology industries. Students will begin creating videos and demos of workshops and trainings as well as at least short (5 -10 minute) video presentations/animations for broadcast on Community Access channels.

We plan to run the video production series of workshops 2 times a year (fall and spring) and as a short summer intensive. We will include a mix of techniques ranging in level form introductory to advanced (as well as experimental.

In **Fall 2018 and Fall 2019**, we will spotlight workshops and trainings that prepare workshoop/video prooduction students to develop the video training skills and participate in our installation for the Portland Winter Light Festival. These events allow workshoop/video prooduction students to engage with technology, collaboratively create something incredibly magical, and share their work with families and friends in a community-based city-wide event. These kinds of installations and shows build the creative confidence of workshoop/video prooduction students, allow them to show their work to potentially interested employers. We had several thousand visitors to our installations this year. Students were able to create connections and learn about opportunities for future work from employers that visited the festival. This time for informal conversation and celebration is less intimidating than a career/job fair and gives the potential employee an opportunity to really showcase their creative ideas and fluency with technology.

M+T+C event topics we intend to offer include projection mapping, creative coding, electronics and microcontrollers, virtual and augmented reality, interactive installations, and games.

October 2018: Report of Summer Activities prepared.

In **Spring 2019 and Spring 2020,** we will emphasize Design and Fabrication workshops (leading up to a show during *Design Week Portland)*.

In **Summer 2019, and Summer 2020**, we will organize M+T+C events. Example: workshops and institutes for STEAM educators in the k-16 system, offering options for professional development credentials. -OR - STEAM workshops for students in grades 6 - 16 focussed on video production, games, virtual and augmented reality, origami, popups, fabrication, and designing digital musical instruments.

Over the course of the grant period, we also intend to more fully develop our curriculum in data science, artificial intelligence/machine learning, robotics, and privacy/security (cryptocurrencies and blockchain).

February 2019: Report of Fall workshops and Progress report on Project prepared. Showcase one - 3 video projects (including one student work at the Winter Light Festival).

June/July 2019: Report of Spring workshops and Progress report on Project prepared. Showcase 1 - 3 video projects (including one student work related to Design and Fabrication, and one related to our Earth Day/International Migratory Bird Day visualisations).

July/August 2019: At least 5 video production workshops and trainings conducted and at least 5 short videos created and ready for broadcast.

October/November 2018: Report of Summer Activities prepared.

Staffed Lab Hours: Throughout the project timeline - Time for play, experimentation, making, informal conversations, peer-learning, observation, and collaborations are essential for creative learning. We have staffed hours in the lab where workshop participants and community partners can drop in and use/reserve technology. This provides important opportunities to interact with mentors and collaborate with peers, and to delve deeper into learning and practice in areas of greatest interest. In general, due to our key card entry, we allow members to enter the lab even when it is unstaffed - our philosophy is that everybody present is available to help as needed so everybody is a mentor or instructor/staff.

Faculty/Mentor Recruitment: Through the Make+think+Code already-significant network of community contacts, as well as through new outreach, we will continue to recruit an excellent, inspiring and diverse pool of faculty. While it is common practice to have volunteers, we pay our faculty for teaching, and provide our residents and fellows with access to lab, equipment, technology, and workshops for free. This allows a more diverse community the opportunities for teaching and mentoring rather than restricting the pool to a community that can afford the time to volunteer for free.

Recruiting our Target Audience (Students and Faculty): We will prioritize recruitment of mentors who meet our pedagogical principles, and who will reflect the diversity we desire in our students. It is important for students to see themselves reflected in their educators and mentors, and to envision such a career pathway for themselves. In order to reach our goal of having 40% of our participants be from communities under-represented in STEAM, the Make+Think+Code staff and faculty, will work with our community and industry partners to develop specific outreach plans to recruit women, people-of-colour, multilingual, immigrant, LGBTQ members - as faculty and staff, but also for our workshops. We already work with New Avenues for Youth and have started conversations with Portland Youth Builders, the N/NE Steam coalition, with the East Metro STEAM PArtnership, and with native schools in the gorge (with NW Noggin). We plan to reach out to the Latino Network, Adelante Mujeres, NAYA, IRCO, iUrbanTeen, Girls Inc, Chicktech to help understand how to best serve their communities, and to help us create the most relevant inspiring curriculum for their communities.

We also hope to reach out to the signators of the Techtown Diversity pledge, and to Diversity and Equity/Hiring Officers at local creative tech companies to help us find ways to support their employees acquiring new skills (either by taking or teaching workshops). We believe that will provide opportunities for advancement, leadership and retention for these employees.

We hope our work with the Digital Inclusion Network (DIN) will help us collaborate with many of these communities.

Making Learning Visible: Showcasing Student Achievements: We intend to have events regularly to showcase student work. Some will be at formal occasions - the Portland Winter Light Festival (first thursday - sat in Feb. 2019, 2020) and Design Week Portland (April/May 2019, 2020) but we will likely also have installations a few times a year in our beautiful building to allow students to share some of the amazing work that they create. This will help them develop their networking skills and confidence but will also hopefully inspire others to participate in our events and workshops. We also hope to have students use the video equipment to create short videos, ignite talks, and podcasts to document their work. These can be featured on the Make+Think+Code/PNCA website, on YouTube and social media channels. We expect to partner with local community television stations to create programming that features projects and documents our events as well.

September 2018 - June 2020: Project Evaluation: During the course of the project, the Make+Think+Code Program Coordinator will ensure that data is collected to support project evaluation. Some of this data collection is fairly straightforward (for example, counting numbers of workshops, registration and attendance, usage of equipment and the lab, demographics, workshop evaluations, ..). More nuanced data and analysis will be collected through surveys, interviews, and analysis.

April 2020: At least 5 more workshops and trainings and at least 5 more short videos created and ready for broadcast.

June 2020: Final Project Report Prepared: In addition to collecting and analysing the data, we will create summary reports 3 times a year during the duration of the project, as well as creating 2 case studies, interesting stories, and significant documentation of student work.

(This field has a character limit of 21000)

Organization Capacity

The applicant should demonstrate the Organization's capacity to successfully integrate the project into the organization.

Organizational Capacity

The Pacific Northwest College of Art has provided an excellent education in art and design to students enrolled in its degree programs (undergraduate and graduate) as well as through community education, pre-college, and teacher education programs. As we moved into our new building, we embraced a

stronger role in the community, and are committed to increasing the diversity of our students and faculty. Our current first-year undergraduate cohort reflects this commitment with 36 % students not identifying as white. We also have increased our percentages of students that are first generatio, immigrant, lgbtq, and multilingual.

Make+Think+Code expands on this vision of inclusion in creativity to bring together members of Portland's vibrant creative, tech, civic, and educational communities to explore the powerful role that creativity and technology play in the search for imaginative and impactful solutions to complex and urgent problems. We have a faculty, staff, residents, and community fellows with tremendous expertise in creative technology, a strong commitment to preparing a diverse community to engage with our local creative tech industry, and a strong commitment to a 21st century education that includes a diversity of intergenerational and interdisciplinary learners with varying levels of experience. We have already generated partnerships with key local community groups, and industry groups to support our workshops by helping us find faculty and mentors, by helping us generate content for workshops, donate technology, sponsor events, and provide expertise as needed. We have (and are developing more) relationships with creative technology agencies to pay for their employees to take our workshops as opportunities for professional skill-building, upskilling, and advancement - thus making these workshops affordable for a broader population.

We have had the lab open since last summer, successfully organized 2 creative technology hackathons, and successfully piloted workshops last fall and this spring. We will use the feedback from these events to develop and refine the content for our workshops for this project. Since we have launched, we have seen increased usage of the space, an increased breadth of community participants, and more complex and collaborative projects.

PNCA has a strong Communications Department, and our PNCA and Make+Think+Code student assistants and staff have excellent social media, web, and design skills to help create assets, promotional materials, catalogues, and campaigns to publicise our workshops and programming. In addition our community partners (in education and makerspaces) as well as industry partners are quite interested in promoting our workshops to their networks. This allows us to have a robust and informative website that we continue to build (pnca.edu/makethinkcode). We create our own tutorials for using our technology (pnca.edu/makethinkcode/technology) and our online/video demos will be an expansion of this mission to encourage peer-learning and connected learning.

Make+think+Code has access to broad and very qualified technical support from the PNCA IT department. This time and expertise is included in our personnel budget. We also get excellent advice about and help maintaining our technology from our faculty and industry partners who have been generous with their time and expertise. Our faculty and mentors have significant expertise in the technologies we have in the lab, and in the content of the workshops. We will offer new staff and mentors necessary training to gain and maintain the skills they require as they join us. Since we hire students and alumni as part of our support of people who have been through the lab, we do have expected turnover as students graduate but it will be a wonderful opportunity to share these skills with new student assistants as they come on-board. In some cases, the necessary technical expertise will be provided by the mentors and volunteers recruited for this project.

PNCA has an excellent Video and Sound Department, as well as an Animation Department. Many of the faculty, staff, students, and alumni have excellent skills in video/audio production (including animation) and are excited about helping us create exciting videos about learning what is possible with creative technology, and how we engage with this at Make+Think=Code@PNCA. We will rely on this expertise to ensure that our content is of the highest quality and impact.

We believe that with the expertise and resources available to us at PNCA, through our faculty and community fellows, and through our industry/community partners, we should easily be able to implement this project well.

(This field has a character limit of 5500)

Measurable Project Outcomes

What project outcomes do you hope to achieve for the identified community or targeted beneficiaries through the use of the proposed technology?*

Outcomes

At least 40% of the students enrolled in the video production workshops and trainings will be from under-represented groups, particularly women and/or people of colour. All students enrolled will gain relevant video production and editing skills and exposure to STEAM technologies/creative careers.

At least 40% of the participants enrolled in our M+T+C events will be from communities under-represented in STEAM/design fields. This includes women/girls, people of color, immigrants, first generation college students, native students, English language learners, LGBTQ communities, people with learning and physical/mental disabilities, and low-income communities.

We will increase the diversity (number of women and/or people of colour) of our faculty/mentors by at least 10%.

We will create videos of at least 5 workshops and trainings as well as at least 10 short (5 -10 minute) video presentations/animations for broadcast through Open Signal's and Metro East Community Media's channels. The content will focus on STEAM and emerging technologies relevant to CTE-STEAM career pathways and industries in Oregon. In addition, we will create and upload these videos to our YouTube account and publicize them on our website and social media channels for broader viewership and distribution.

Make+Think+Code will offer 100 workshops, trainings and demos focused on creativity, making, emerging technology and fabrication enrolling 500 participants and generating 100 visitors to the lab.

Budget Narrative

Budget Narrative

Make+Think+Code Executive Director: The Executive Director will oversee the curriculum - helping to select topics (after dialogue with students, educators, and community/industry partners; Hire, mentor, train and review faculty. Recruit participants for workshops, partners for the project to help with video production; find, develop, and apply for other sources of funding (technology donations, sponsorships, grants) for the lab and the workshops (including for scholarships). She will also work with PNCA's IT and Facilities Departments to oversee the infrastructure improvements and work with our Office of Institutional Research for Assessment and Evaluation related to the grant. The cost to the project will be (10 hrs/ week for 25 months (hourly cost +fringe benefits $100)) $100,000

Grant Funds: $0

Pacific Northwest College of Art Match Funds: $100,000

Make+Think+Code Program Coordinator: The Program Coordinator will coordinate the Make+think+Code lab activities. Responsibilities will include hiring, scheduling and coordinating lab staff, scheduling demos and workshops, overseeing equipment and materials for workshops, supporting faculty, training lab staff on equipment; helping with recording and editing videos of workshops and Demos; and helping the Director organize educational hackathons and events. She will also help IT staff setup, install, and maintain relevant equipment and software for the video production.

The coordinator will also be responsible for meeting budget and timeline targets, preparing reports and collecting workshop evaluation, attendance and participation, and lab/equipment use data. The Project Coordinator will work 20 hours per week for 70 weeks of the project timeline (hourly cost with fringe benefits of $40).

Grant Funds: $0

Pacific Northwest College of Art Match Funds: $56,000

Technology Staff

The technology staff include members of PNCA's IT department and together with the Program Coordinator and Make+think+Code faculty who teach video prooduction classes will set up the new equipment and computers, help with designing the electrical and Ethernet infrastructure of the space. In addition, they will work about 5 hours a week on maintaining our computers for the workshops and editing, installing/updating software, maintaining the access systems (keycards) and logs to the lab,and maintaining/updating our network ports and wifi. 600 hours at $50/hr (salary + fringe benefits).

Grant Funds: $0

Pacific Northwest College of Art Match Funds: $30,000

Faculty:

Make+Think+Code faculty will teach 100 workshops (3 - 12 hrs each) ($75/hr) + 100 trainings (1 - 3 hrs each) ($50/hr).

Grant Funds: $0

Pacific Northwest College of Art Match Funds: $75,000

Assessment and Evaluation:

Make+Think+Code faculty with expertise in research design and assessment will provide expertise and work

with the executive Director, Program Coordinator and our Office of Institutional Research on the evelauation and assessment for the project (10 hours at $100/hr).

Grant Funds: $0

Pacific Northwest College of Art Match Funds: $1,000

Project Support:

Our faculty and staff all spend time in the lab helping one-one-one with projects and experiments, shows and hackathons, doing trainings, helping with recording and editing videos , organizing shows and events, documentation of projects and events. This is a significant component of connected/peer learning and Mentoring.

These include volunteers from industry partners (in-kind 10 hrs/week, 30 weeks a yr $25/hr), community members working in exchange for access to our lab equipment and workshops (in-kind 10 hrs/week, $20/hr, 30 weeks a year); work study ($12/hr, 20 hrs a week, 30 weeks a yr)

Grant Funds: $0

Pacific Northwest College of Art/Industry Partner Match Funds: $27,000

Facilities Staff

To help build storage, assemble trusses, oversee electrical, infrastructure work (@5/hr, 40 hours).

Grant Funds: $1,000

Pacific Northwest College of Art/Industry Partner Match Funds: $0

EDUCATION AND TRAINING Personnel

We can do much of our training in-house: Our Video and Sound Department /major has many faculty, a tech, and students skilled in video recording and editing, and we will also be supported by staff in the Communications Department (photo/video documentation and editing), our Media Resource Center and IT Departments (Using the Mediatheque recording equipment) We will avail of their expertise to train our staff and faculty (Program Coordinator + 1-3 lab staff who will assist the video production on the new video recording equipment) so that we have a wide pool of people who can do this. (time at $25/hr x 40 hrs/yr)

Grant Funds: $1000 (initial training)

Pacific Northwest College of Art Match Funds: $1,000 (ongoing training)

CONTRACTUAL

Much of our consulting is through in-kind volunteer time with our industry and comunity partners (recommendations for technology, equipment, software, and space/infrastructure design; help maintaining technology; informal mentoring of projects; engagement with events; troubleshooting technology projects). We would estimate the time to be about 25 hours (at $100/hr in-kind).

These will likely include people form Actual Industries, W+K lodge, Instrument, Second Story and we will recruit more for the project. all will help with advising on curriculum, help find diverse faculty, and suggestions for equipment and software. All support will be volunteer in-kind.

Grant Funds: $0

Pacific Northwest College of Art Match Funds: $2,500

EQUIPMENT

Equipment	Grant Funded	Match Funded
Video Production.		
Video cameras (fixed, handheld, still)+lenses	$15,000	
Webcams (5)		$359
3D depth sensing camera		450
Field recorders, mics, audio, cables	5000	
Rigs, tripods, dollies, mounts	6000	
lightbox - 3	900	
Lighting kit	600	
Headphones -4	1500	
Audio thunderbot interface - 2	1700	
USB audio interface -1	549	
Video thunderbolt capture device - 4	600	

360 camera -1	400	
Video live switcher	2500	
Mixer/interface/synthesizer	3000	
Google daydream - 2	200	
Mira prism - 2	300	
LED short throw projector - 3	6000	900
Pick projector - 3	900	
kinects 2-3	1500	
Midi controllers - 5		500
Media placers -5	1250	
2d scanner	200	200
3D scanner structure sensor + iPad	600	
Perception neuron motion sensor	2000	
Video Editing		
MSI VR ready laptio - 9	9000	4500
iPad Pro - 6	4200	
Mac Pro - 2	10000	
3 V/R/video editing PC workstations with 2tb hard drives	5400	5400
Wacom cintiq (x2) companion studio	4100	1700
MacBook Pro - 10	10000	10000
iMacs pro - 2	10000	
Wacom cintiq pro	2500	
Unlocked mobile app/ar design - 4	2800	
The Vives w/ trackers - 3		1800
Oculus rift - 8		6000
Samsung odyssey		550
Google cardboard - 2		50
Video software		
Max/map (video edit/performance) - 3	1200	
Vdmx (video edit/performance) -3	300	100
Isadora (video edit/performance) -3	1000	500
Mad mapper (video projection mapping) - 8	1050	1750
Ableton (sound editing) -2	900	
Adobe creative suite		5000
Ms office (pc laptops/workstations for VR)	930	465
Rhino - (3D design) -10.		2000.
Touch designer - 3	600	
Mira app - 10	100.	
Tiltbrush VR painting ap - 10	200	
Gravity sketch basic - 10	250	
Fabrication equipment		
3D printers		5000
Plotter, large format printer, vinyl cutter		4000
Laser cutter, milling machine		30000
PocketNC desktop cnc router + accessories		8000
Soldering equipment		2000
3 programmable sewing/embroidery machines		3000
Measuring/craft tools		2000
Materials		
Arduino kits (variety - 30), raspberry pi's + kit (10) teensy, breadboards, wires, cables, Mackey-Mackey		6500.

Mackey-Mackey inventor kits - 2		150
Conductive thread, ink, lily pad arduinos, sewing material - wearable tech		2000
Materials for fabrication workshops (vinyl, acrylic, cardboard, plywood, ceramic, filament		2000
TOTAL	**$115,229**	**$101,465**

INFRASTRUCTURE COSTS

Storage, Buildout, and Screens

The project's storage costs will include secure cabinet storage for the video recording equipment costing $1500 and $1500 for 2 rear projection screens. $3000 for workbench/tables for cnc router.

Grant Funds: $ 6,000

Pacific Northwest College of Art Match Funds: $0

Trusses and Technology Infrastructure:

The cost of building and wiring trusses/struts to mount cameras, lighting, projector for recording Trusses and supports for projectors, cameras, lighting with electrical wiring for recording. The project's technology infrastructure will include adding ethernet ports, Increased wifi, additional Wiring and electrical outlets near fabrication, workshop, and recording equipment. Trusses - 8 sections of unistrut +labour; ballasts for lighting; Technology-s 8-10 quad network ports, 8-10 quad electrical outlets; 250 ft conduit; misc hardware + labour 30 hrs @$100/hr). (Shared)

The cumulative cost for this technology infrastructure is estimated at $6,000

Grant Funds: $ 6,000

Pacific Northwest College of Art Match Funds: $0

MISC

Student Stipend for Video Recording

Grant Funds: $0

Pacific Northwest College of Art Match Funds:$3000

OVERHEAD COSTS

Indirect overhead costs for the project include the costs of liabiliity (having students in a makerspace/lab/workshop), utilities for the space, security for the duration of the project, accounting for the project through our Business Office, using our web resources and registration systems for our workshops and trainings; cost of using wifi and network; tech staff support; facilities and maintenance of the space for the duration of the project. PNCA usually uses an overhead rate of 10% for federal grants. We anticipate this grant being less burdensome on PNCA resources and having an overhead at 5% on the total project budget (27,550) $ PNCA will cover the cost of this.

Grant Funds: $ 0

Pacific Northwest College of Art Match Funds: $ 27,550

Statement of Matching Resources

A project will not be considered eligible for funding unless the applicant documents the capacity to supply matching resources of at least 50 percent (50%) of the total project cost.

The Statement of Matching Resources is essential to understanding which project costs identified in the Budget Narrative and the line Item Budget will be supported by the applicant organization and which project cost will be supported by Project Partners.

STATEMENT OF MATCHING RESOURCES

Resources contributed by Pacific Northwest College of Art:

- $ 100,000 in salary and fringe for the Project Director (Executive Director of Make+Think+Code).
- $ 56,000in salary and fringe for the Project Coordinator (Make+think+Code Program Coordinator). (PNCA Operating Budget/Revenue from workshops)

- $3000 in salary and fringe for IT Staff.
- $1000 in assessment and evaluation by Make+Think+Code faculty. (Part of faculty responsibilities/salary for Make+think+Code)
- $75000 in salary for the workshop/training faculty (Revenue from Make+Think+Code workshops).
- $27,000 in in-kind/volunteer time from alumni residents, faculty fellows, mentors.
- $1,000 for Facilities Staff
- $1,000 for Education and Training.
- $101,465 in equipment - PNCA budget+ in-kind equipment and materials donations
- $2500 for Contractual Costs. (Volunteer in-kind)
- $27,550 for Overhead Costs
- $3000 in Stipend

Total contribution: $424,515

Line Item Budget

Cost Category		Grant Funds	Match Amount	Project Total
Personnel		$1,000.00	$289,000.00	$290,000.00
Education and Training		$1,000.00	$1,000.00	$2,000.00
Travel		$0.00	$0.00	$0.00
Contractual		$0.00	$2,500.00	$2,500.00
Equipment		$115,229.00	$101,465.00	$216,694.00
Infrastructure/Facilities Construction		$12,000.00	$0.00	$12,000.00
Miscellaneous		$0.00	$3,000.00	$3,000.00
Overhead		$0.00	$27,550.00	$27,550.00
	Totals	$129,229.00	$424,515.00	$553,744.00

Final Application Signature

Signature of Duly Authorized Representative*	Mark Moreland
Date*	04/06/2018
Title*	CFO
Phone*	503-821-8910
E-mail*	mmoreland@pnca.edu

Supplemental Material Attachments

File Name	Description	File Size
mhcrcbudgetlinefinal.xlsx (42 KB)	mhcrcbudgetlinefinal	42 KB
mtccat2017-18booklet.pdf (2.4 MB)	mtccat2017-18booklet	2.4 MB
mtconepage1117.pdf (103 KB)	mtconepage1117	103 KB
mtcprograms2017-18booklet.pdf (4.6 MB)	mtcprograms2017-18booklet	4.6 MB
schematicmtc.pdf (231 KB)	schematicmtc	231 KB

Partner Commitment Letter(s)

Cost Category	Grant Funds		Match	
Personnel	$	1,000.00	$	303,400.00
Education and Training	$	1,000.00	$	1,000.00
Travel	$	-	$	-
Contractual	$	-	$	2,500.00
Equipment	$	113,729.00	$	102,965.00
Infrastructure/Facilities Construction	$	12,000.00	$	-
Miscellaneous	$	1,500.00	$	1,500.00
Overhead			$	27,550.00
Total	$	129,229.00	$	438,915.00

Total	
$	304,400.00
$	2,000.00
$	-
$	2,500.00
$	216,694.00
$	12,000.00
$	3,000.00
$	27,550.00
$	568,144.00

Personnel	Grant Funds	
Executive Director	$	-
Program Coordinator	$	-
IT Staff	$	-
Assessment and Evaluation	$	-
Faculty, Instructors	$	-
Alumni Residents, Fellows, Mentors	$	-
Student Assistants	$	-
Facilities Staff (helping with new infra		$1,000
Total	**$**	**1,000.00**

Match		Total	
$	100,000.00	$	100,000.00
$	56,000.00	$	56,000.00
$	30,000.00	$	30,000.00
$	1,000.00	$	1,000.00
$	75,000.00	$	75,000.00
$	27,000.00	$	27,000.00
$	14,400.00	$	14,400.00
		$	1,000.00
$	**303,400.00**	**$**	**304,400.00**

Equipment	Grant Funds	
Video Equipment		
Video cameras (fixed, handheld, still)+lenses	$	15,000.00
webcams (5)		
3d depth sensing camera		
field recorders, mics, audio, cables	$	5,000.00
rigs, tripods, dollies, mounts	$	6,000.00
lightbox - 3	$	900.00
lighting kit	$	600.00
headphones - 4	$	1,500.00
Audio Thunderbolt Interface -2	$	1,700.00
USB audio Interface - 1	$	549.00
Video Thunderbolt Capture Device -4	$	600.00
360 camera - 1	$	400.00
Video Live switcher	$	2,500.00
mixer/interface/synthesizer	$	3,000.00
google daydream - 2	$	200.00
mira prism - 2	$	300.00
Led short throw projector - 3	**$**	**6,000.00**
pico projector - 3	$	900.00
kinects 2 - 3	$	1,500.00
midi controllers - 5		
mediaplayers-5	$	1,250.00
2d scanner	$	200.00
3d scanner structure sensor + ipad	$	600.00
perception neuron motion capture		$2,000

Video Editing/Production		
MSI VR ready laptop - 9	$	9,000.00
ipad pro - 6	$	4,200.00
mac pro - 2 (video editing)	$	10,000.00
3 V/R/video editing/gaming PC workstations with 2tb hard drives		
Wacom cintiq (x2), companinon studio		
Macbook pro - 10	$	10,000.00
imacs pro - 2	$	10,000.00
wacom cintiq pro	$	2,500.00
unlocked mobile phones for app/ar design -4	$	2,800.00
htc vive w/ trackers - 3		

oculus rift - 8		
samsung odyssey		
google cardboard- 2		
Video Software		
max/msp (video edit/performance) - 3	$	1,200.00
vdmx (video edit/performance) - 3	$	300.00
isadora (video edit/performance) - 3	$	1,000.00
mad mapper (video projection mapping) - 8	$	1,050.00
ableton (sound editing) -2	$	900.00
adobe creative suite - 100		
ms office (pc laptops/workstations for fabrication/vr) - 15	$	930.00
rhino - (3d design) - 10		
touch designer - 3	$	600.00
mira app - 10	$	100.00
tiltbrish vr painting app - 10	$	200.00
gravity sketch - basic - 10	$	250.00
Fabrication Equipment		
3d printers		
plotter, large format printer, vinyl cutter		
laser cutter, milling machine		
pocketNC desktop cnc router +accessories	$	8,000.00
soldering equipment		
3 programmable sewing/embroidery machines		
measuring/craft tools,		
Materials		
Arduino kits (variety - 30), raspberry pis + kit (10), teensy, sensors, breadbords, wires, cables, makey-makey		
makey-makey- inventors kit - 2		
conductive thread, ink, lilypad		
arduinos,sewing material - wearble tech		
materials for fabrication workshops for broadcast (vinyl, acrylic, cardboard, plywood, ceramic, filament)		

Total	**$**	**113,729.00**

Match	Total
	$ 15,000.00
$ 350.00	$ 350.00
$ 450.00	$ 450.00
	$ 5,000.00
	$ 6,000.00
	$ 900.00
	$ 600.00
	$ 1,500.00
	$ 1,700.00
	$ 549.00
	$ 600.00
	$ 400.00
	$ 2,500.00
	$ 3,000.00
	$ 200.00
	$ 300.00
$ 900.00	$ 6,900.00
	$ 900.00
	$ 1,500.00
$ 500.00	$ 500.00
	$ 1,250.00
$ 200.00	$ 400.00
	$ 600.00
	$ 2,000.00
$ 4,500.00	$ 13,500.00
	$ 4,200.00
	$ 10,000.00
$ 5,400.00	$ 5,400.00
$ 5,800.00	$ 5,800.00
$ 10,000.00	$ 20,000.00
	$ 10,000.00
	$ 2,500.00
	$ 2,800.00
$ 1,800.00	$ 1,800.00

$	6,000.00	$ 6,000.00	
$	550.00	$ 550.00	
$	50.00	$ 50.00	
		$ 1,200.00	
$	100.00	$ 400.00	
$	500.00	$ 1,500.00	
$	1,750.00	$ 2,800.00	
		$ 900.00	
$	5,000.00	$ 5,000.00	we have a site license
$	465.00	$ 1,395.00	
$	2,000.00	$ 2,000.00	
		$ 600.00	
		$ 100.00	
		$ 200.00	
		$ 250.00	
$	5,000.00	$ 5,000.00	
$	4,000.00	$ 4,000.00	
$	30,000.00	$ 30,000.00	
$	2,000.00	$ 2,000.00	
$	3,000.00	$ 3,000.00	
$	2,000.00	$ 2,000.00	
$	6,500.00	$ 6,500.00	
$	150.00	$ 150.00	
$	2,000.00	$ 2,000.00	
	$2,000		

$	**102,965.00**	**$**	**216,694.00**

Category	Grant Funds		Match	
Infrastructure				
Storage for video equiment	$	3,000.00		
Workbenches/tables for equipment	$	3,000.00		
Trusses - 8 sections of unistrut +labour; ballasts for lighting; Technology-s 8-10 quad network ports, 8-10 quad electrical outlets; 250 ft conduit; misc hardware	$	6,000.00		
Total	**$**	**12,000.00**	**$**	**-**
Overhead				
Includes liability, utilities, security, facilities, it for wifi/tech/network, Publicity/Marketing for program, business office managing funds for project				
Total	**$**	**-**	**$**	**-**

Total	
$	3,000.00
$	3,000.00
$	6,000.00
$	**12,000.00**
$	-
$	**-**

MAKE+THINK+CODE@PNCA

WORKSHOPS AND INSTITUTES

2017 - 2018

Contents

Introduction

+ All of our programming is intended for a motivated audience that includes advanced undergraduates, graduate students, educators, and professionals working in the creative/tech industries. A beginning undergraduate or high school student who is excited by the content and willing to work at an advanced level is strongly encouraged to apply.

+ The STEAM workshops are intended for students in grades 6 — 12.

Levels:

- Trainings and Fundamentals: 100/200 level.
- Introductory: 300 level. Prior art, design, or technology experience.
- Intermediate: 400/500 level. Need significant prior experience.
- Advanced: 500/600 level. For the professional or expert in the field.
- STEAM: 0/100 level. grades 6 — 13.

Key:

+ CTE Creativity, Technology, Experience

+ DSI Data, Systems, and Complexity: Insights, Interpretations, Visualisation

+ FAB Design + Fabrication

+ PS Privacy and Surveillance

+ CC Creative Coding

+ TECH Technology Fundamentals

+ PDE Professional Development and Education

+ CRE Creative Entrepreneurship

+ MATH Mathematics

+ SCI Science including Physics, Materials, Modelling Natural Systems, Computer Science, Cognitive Science and Psychology

+ CULT Technology and Society

+ MTC Make+Think+Code Institutes

+ STEAM Steam workshops for grades 6 — 13

PRINCIPLES/VALUES: OUR PROGRAMMING WILL EMPHASIZE

+ Synthesizing strategies — creativity/making + technology+ design-thinking + research + experimentation + prototyping

+ Critical thinking + history/context/implications

+ Project/inquiry-based; emphasizing Impact, and context, real-world relevance, and professional applications.

+ multi/inter/trans/anti disciplinary

+ Exposure to multiple ways of knowing

+ Models, systems, and networks

+ Inclusivity/empathy/compassion

+ Collaborative creative problem-solving with cross-disciplinary diverse teams of stakeholders

+ Dialogue between tools, processes, and systems

+ Working with new and emerging media/technologies

+ Learning how to learn independently

+ PLAY

+ Peer- mentoring/learning

+ Professional and personal development

■ Workshop participants will have access to the lab for a certain time after the workshop and access to feedback, support, and mentoring for their projects.

REGISTRATION FOR MAKE+THINK+CODE WORKSHOPS AND INSTITUTES

PNCA STUDENTS

+ Login to your self-service account (http://reg.pnca.edu)
+ Under search, search by keywords **mtc** or **makethinkcode** to find workshop listings.
+ Alternatively, click on "search" –> "advanced search" and choose "Make+Think+Code" under Programs.
+ Register as you would for a regular class.

HOW TO GET CREDIT FOR MAKE+THINK+CODE WORKSHOPS AND INSTITUTES

+ Make+Think+Code workshops may be taken for credit. To register, sign up as above and then **also complete an independent study form** (collect from the registrar).
+ Meet with your chair and Professor Nandini Ranganathan (the Executive Director of Make+Think+Code) to determine the expectations and assignments as well as the faculty of record for the Independent Study. Include the workshop title(s) that you will be taking on the Independent Study Form.
+ Have the form approved by the chair (for studio credit) and the Dean by the end of week 2 of classes. The Executive Director (Nandini Ranganathan) and the Dean need to approve Mathematics and Science Credit.
+ Work will be assessed by the outcomes and expectations of the relevant credit assigned (mathematics, science, studio elective, graduate ...). The assessment will be carried out by a faculty member assigned in collaboration with the Executive Director by the relevant Chair/Lead/Director.

COMMUNITY

+ Go to the Make+think+Code website for workshops http://pnca.edu/makethinkcode/programs
+ Click on the workshop title: you will see a link to register. The Make+Think+Code Program Office will contact you with more details about materials and information after you register.
+ You may also directly register at http:makethinkcode.eventbrite.com

+ **To get credit for a Make+Think+Code workshop** (including graduate continuing education/professional development credits for educators), please send email to mtc@pnca.edu for the required paperwork and fees.

CTE Creativity, Technology, Experience

CTE 300 ♦ Augmenting the World with Light: Projection Mapping

Instructor: Craig Winslow. 3 hours.

Learn how to take control of light in a whole new way, and augment the world around you with animations, color, simulated lighting, and more. We'll start with a quick conceptual overview, analyze various opportunities/limitations of the medium, then dive into a few live demos of what's possible with projection mapping, using MadMapper.

Once you know the basics of mapping, it's all about content! This workshop will be content-driven, sharing how to optimize your workflow by organizing a video template, tips I've learned to map rapidly during different "projection-a-day" road trips, live-video mixing, and using MIDI to make that job a lot smoother.

We'll also touch on the fun logistics behind organizing a mapping installation, deciding what projectors you'll need, how to mount them in difficult spots, and how to put together a mobile mapping setup.

Prerequisite: None.

Required Materials: Computer, Adobe Creative Cloud (Photoshop, Illustrator, After Effects), MadMapper.

CTE 301 ♦ Recreating and Animating Ghostsigns for Projection Mapping

Instructor: Craig Winslow. 6 Hours.

Choose a ghost sign, flatten and stitch photos of it, vectorize it. Learn some simple animation effects, export, and prepare it for projection mapping. Then projection mapping demo.
Learn:
— Flatten and stitch photos in Photoshop
— Master the Pen Tool in Illustrator
— A few neat tips about type design and sign painting history
— Bust out quick and simple animations in After Effects
— Basics of projection mapping in MadMapper

Prerequisite: Helpful to have basic working knowledge of Photoshop , Illustrator.

Required Materials: Computer, Adobe Creative Cloud (Photoshop, Illustrator, After Effects), MadMapper.

Preparation: Print out a big version of a ghost sign for mapping demonstration.

CTE 360 ♦ Creating for Mixed Reality

Instructor: Thomas Wester. online (12 sessions) (https://www.kadenze.com/programs/creating-for-mixed-reality) + semester-long class

Creating for Mixed Reality is an introductory series of classes that explore the landscape of augmented, mixed and virtual reality, mapping out the different experience paradigms and hardware interfaces guided by readings and interviews with an inspiring mix of creative practitioners and industry professionals.

The space we are exploring is evolving fast and this course does not emphasize acquiring skills in specific tools or platforms, as these will quickly be dated. Instead, we focus on providing a conceptual and theoretical foundation, on artistic experimentation and exploration, and on challenging your thinking and perception. This course aims to provide the confidence, inspiration, and skills to teach yourself the methods and technology required to create for mixed reality.

Course assignments include a mix of research and practice. Research happens through reading, and through watching film and reflecting back. The readings help you think critically about the medium and its connection to aesthetic and cultural concerns and to more established media. Practice includes building experiences in Unity based on templates and guides provided by the instructor.

Prerequisite: None.

Required Materials: A computer with Unity installed.

CTE 391 ♦ Collaborative Video Environment/ Painting space with videos

Instructor: Shannon Willis. weekend (12 hours)

Everyone has a point of view, and these days most people have a phone capable of documenting that special viewpoint. In this workshop we will collaborate on bringing our diverse points of view together to make a physical video installation environment. We will collaborate online before the workshop to determine a theme or direction we want the final piece to go. On the first day, we will each bring video footage and edit it for the installation. We will also learn about material prep for set up day. On the second day, we will carefully create and install a collaborative work onsite.

We will go through several different strategies and media platforms including monitors, computers, video players and projectors. Combining projections, TVs, and physical objects, they become covered in moving images. From there, we can begin to see videos as paint, and objects and walls as canvas.

Prerequisite: None.

Required Materials:

CTE 392 ♦ Projection Hack: Immersive Collaborative Light Collage

Instructor: Craig Winslow. 3 hours

Now that we have the basics of projection mapping, let's augment the space with light!
After a quick 15 min refresher/overview on projection mapping, this will be a hands-on session as we projection map video, animations, code, live video, data and more ... to walls, pipes, ceiling vents, windows, pillars — if you can see it, you can map it!

Come prepared with pre-made content if you have a specific idea, or show up and make something on the fly. Still don't feel comfortable with mapping? The best way to learn is by doing!

By the end of the session, we'll have a finished collaborative project: an immersive light collage!

Prerequisite: CTE 300 or equivalent (Basic knowledge of projection mapping).

Required Materials: Computer, Adobe Creative Cloud (Photoshop, Illustrator, After Effects), MadMapper.

CTE 393 ♦ Building Digital Instruments

Instructor: Shawn Trail. Weekend (12 hours)

In this two-day workshop participants will learn to design and build custom sound and light controllers using open-source and low-cost materials. These skills will serve a wide variety of applications from being compatible with commercial sound software via MIDI, to more advanced multi-media networking protocols such as Open Sound Control (OSC) and sophisticated visual processing and projection mapping software such as VDMX and more. Students learn to code basic synthesizers in Pd and build control mapping paradigms to route to visual processing software for live performance/interaction.

Students learn to code basic synthesizers in Arduino/Pd and build control mapping paradigms to route to visual processing software for live performance/interaction. Participants will learn the basics of building a simple circuit for sensors and micro-controllers and design hardware housing for them to be 3D printed.

Prerequisite:

Required Materials: ipads*; camera connector USB adaptor ($7.90) ; audio out cables ($5.00); Puredata (PdParty); audio mixer/speakers; 3D printer/Google SketchUp; Teensy LC micro controller ($11.65); LED switches x12 ($2.95); slide pot x4 ($1.95); rotary pot+knob x8 ($1.45)

CTE 393 ♦ Video as performance: Introduction to Live Cinema and VJing

Instructor: Megan McKissack. 3 Hours.

This workshop will introduce live video performance and techniques using VDMX. This modular system allows for customization and integration of various external tools. We?ll explore some of the available tools and build a two channel video mixer to start experimenting with performance while developing understanding of possibilities and aesthetics of improvisation with video.

Prerequisite: None.

Required Materials: A Laptop with VDMX (demo version) installed.

CTE 400 ♦ Creating Interactive and Immersive Installations

Instructor: Shannon WIllis. 12 hours (2 days).

In this 2 day intensive you will get a taste of the complex and exciting world of creating interactive video installations and immersive physical environments. This course breaks down and introduces some of the technologies and equipment that can turn ideas into a physical reality. Learning technology is only part of the journey, as significant time will be devoted to learning about the aesthetics of interaction. What does it mean to make an interactive work of art? As the process continues we will engage in group in-process critiques that will help define the scope and direction of our works. We can begin to shift our thinking as makers of objects of art that lies outside of the viewer, to creators of an experience where the viewer is invited to step within and become a part of. Participants may work alone or in teams to create interactive installations.

Prerequisite: None.

Required Materials: Arduino and Isadora

CTE 430 ♦ Interaction in a Spatial Context I: Fundamentals

Instructor: Daniel Meyers and Traci Sym. 12 hours (2 days).

Since humans began recording images on cave walls by torchlight, viewers have attempted to construct meaningful relationships between media and the spaces they occupy. Cave paintings tell a story about the ancient world in which the narrative is animated by its spatial context.
Digital media couples narrative with user interaction to create immersive experiences that can be leveraged in space in new ways. Interaction in a Spatial Context is a workshop to explore new interaction design paradigms that emerge from situating digital media in space. Over the course of one weekend, basic and foundational space-media typologies will be examined, and an introductory design exercise will be conducted.

Prerequisite: knowledge of fundamentals of interaction and experience design.

Required Materials: Modelling materials (card stock and dowell for model 1)

CTE 440 ♦ The Walls Have Eyes: Live Video as a Control Signal

Instructor: Ben Purdy. 6 hours.

Often overlooked as an input mechanism, live video is a versatile tool for interactive media. While video can be useful as a source of visual content, capturing the motion of people or objects moving through space can also create an extremely expressive and dynamic control signals for use in many different interactive contexts.

This workshop will introduce participants to several common techniques and tools that harness live video, using visible light, infrared, and 3D sensors to capture movement in space. Software tools such as OpenCV, OpenTSPS, and Processing will be used to extract motion, shape, and color information from live video sources.

Prerequisite: Familiarity with Processing is strongly encouraged but this workshop could be beneficial to anyone interested in learning about the capabilities of video as a general purpose control mechanism.

Required Materials:

CTE 450 ♦ Painting with Bitmaps

Instructor: Jeremy Rotsztain. 10 hours. (weekend)

Painting with Bitmaps is a two-day workshop exploring programmatic composition techniques using digital images as a source material. We will start by looking different strategies and algorithms that artists use in their work. We will learn to how access pixels that are stored in a computer's memory and play with a few different techniques for generating new imagery. Students will spend some time adapting algorithms (pixel sorting, masking, pixel-to-vector transformations) and writing their own. The workshop will be taught using Processing (http://www.processing.org) and participants are expected to have some experience with Processing or other creative coding frameworks.

Prerequisite: A working knowledge of processing would be helpful.

Required Materials: laptops/PCs with Processing installed.

CTE 461 ♦ Realtime Skeleton Animation in Unity

Instructor: Surya Buchwald. 4 hour workshop

Unity is a powerful and free platform for building games and applications. In this two-part workshop, we will build visual instruments made for live graphics performance. On day one, we'll explore basic interactivity, tweening, velocity sensitivity, generative art and object pooling. A week-long break gives time to work on your scenes, because day two kicks off with a show and tell of what you've made! We'll then explore shaders, MIDI interpretation techniques and more. Animation Example

Prerequisite: Prerequisite: Intro to Unity class at MTC or elsewhere, or watching ?Using the Unity Interface? and ?Essential Unity Concepts? at https://unity3d.com/learn/tutorials/topics/interface-essentials

Required Materials: Laptop with Unity Installed, MIDI controller

CTE 490 ♦ Performing Live Graphics with Unity and MIDI

Instructor: Surya Buchwald. 10 hours over two days, 1 week break in the middle

Unity is a powerful and free platform for building games and applications. In this two-part workshop, we will build visual instruments made for live graphics performance. On day one, we'll explore basic interactivity, tweening, velocity sensitivity, generative art and object pooling. A week-long break gives time to work on your scenes, because day two kicks off with a show and tell of what you've made! We'll then explore shaders, MIDI interpretation techniques and more.

Prerequisite: Amateur knowledge of Unity and some programming basics

Required Materials: Laptop with Unity Installed, MIDI controller

CTE 491 ♦ Color Organs, Lumia Boxes and Light Shows

Instructor: Sue Slagle. 12 hours (consecutive weekends)

Synopsis: A hands-on workshop for synaesthetic instruments, inspired by history.
As early as the 18th century people began experimenting with creating machines that would produce color, or light, in response to and in sync with music. The idea of making a synaesthetic instrument will be the motivating force in this workshop. Using the Max/MSP/Jitter object-oriented programming language this workshop will explore the history of this tradition, the works of Oskar Fischinger, Len Lye, Thomas Wilfred and others, and then offer students tools to create their own machines. Digital and physical synthesizers, keyboards and other interfaces will be mapped to projected images, light bulbs, LEDs, DMX lighting and other light sources.

Prerequisite:

Required Materials: a laptop running Max ($\geq$ 5), projector (or multiple), midi-keyboards, DMX lights, controllable LEDs, lightbulbs, overhead projectors

CTE 493 ♦ Building Digital Instruments: Raspberry Pi Instrument Design

Instructor: Shawn Trail. Weekend (12 hours)

In this 2 day follow-up workshop to BDI1, participants learn to integrate their projects with a Raspberry Pi, replacing their laptops making their designs autonomous. This workshop will focus on low-cost, open source computing for artists without prior background with embedded micro-computing. Topics explored will be Machine Learning applied to sound, Music Information Retrieval, and Digital Signal Processing for audio.

Prerequisite: Building Digital Instruments I (CTE390) or equivalent experience.

Required Materials: Raspberry Pi 3b

CTE 493 ♦ Video as performance: Introduction to Live Cinema and VJing

Instructor: Megan McKissack. 3 Hours.

This workshop will delve deeper into live visual performance tools and techniques using VDMX. We?ll explore data driven control and automation, using audio, midi, oscillation, and even video layers. We?ll cover projection mapping techniques and explore possibilities of video and input sources.

Prerequisite: CTE 393 or equivalent experience. Some knowldege of VDMX adn MadMapper

Required Materials: A Laptop with VDMX (demo version) and MadMapper installed.

CTE 530 ♦ Interaction in a Spatial Context II: Beginning Design

Instructor: Daniel Meyers and Traci Sym. 12 hours (2 days).

Building on the basic skills introduced in CTE 430 (*Interaction in a Spatial Context I*), we will examine tools and methodologies used to design experiences in space. Workshop participants will work in small teams or as individuals to model and prototype narrative and interactive spatial experiences.

Prerequisite: CTE 430

Required Materials: Modelling materials based on student group preference, Improvised media prototyping tools (pico projectors, audio transducers, etc)

CTE 540 ♦ Rapid Experiences and Interactions

Instructor: Salvador Orara. 5-hours.

NTK (the NETLab Toolkit) is an authoring system for designers, developers, makers, researchers and students who want to design and build tangible Internet of Things projects. With a simple drag and drop interface, connect sensors, actuators, media and networks with the smart widgets. Concepts can be prototyped quickly, encouraging iteration, experimentation and testing by sketching in hardware and building connected systems. This workshop will introduce the NTK, Arduino, sensors, and actuators. Students will be prompted to create a low-fidelity interactive prototype and presentation around a creative brief. A short lecture and demonstration will be included.

Prerequisite: Experience with Arduino is a plus but not required.

Required Materials: Arduino + sensors actuator pack will be supplied. Laptops with software pre-installed will be required.

CTE 541 ♦ Planetary Scale Interactive Installations — Using the Internet to Erase Physical Distance

Instructor: Ben Purdy. 10 hrs (weekend)

The internet offers an amazing opportunity to create massively distributed physical projects which can act as one cohesive whole. Using simple and widely available software platforms, workshop attendees will learn how to use the internet to bridge any physical distance and create massively distributed interactive systems.

Based on platforms like node.js, arduino, ESP8266, and raspberry pi, this workshop will result in on connecting a physical control (like a button or knob) to some kind of output (like a motor or LED) regardless of the distance between the two devices by linking the two over the internet.

Prerequisite: Some familiarity with arduino as well as with JavaScript or Processing.

Required Materials:

CTE 630 ♦ Disruptive Play

Instructor: Salvador Orara. five 3-hour classes over the course of five weeks.

This workshop includes five 3-hour classes over the course of five weeks; where participants will be required to work between weekly classes. Rooted in a making-oriented-research spirit, group-based projects will focus on creating public experiences, disruptions, and provocations. Participants will be required to take their projects out into the public to discover an audience, environment, or a transient space; and design experiences to disrupt, tease, excite, and more. As much as this workshop is 50% about play; the other 50% is about documentation, recording, and observation. Will include a kick-off lecture with examples. Discussions about success vs. failure.
4 teams of 3. Multi-disciplinary teams work best.

Prerequisite: Strong Working Knowledge of Communication Design

Required Materials: Laptops with Adobe suite and video editing capabilities is required. Documentation and measuring tools will be required and can include: photography, video, audio recorders, counters, measuring tape, arduinos, sensors, etc.: to be purchased by students as needed. Access to printing services and projectors and other digital devices are not required but applicable.

CTE 690 ♦ Live Cinema Projection Playground

Instructor: Sue Slagle. 3 – 5 hours, quarterly.

A place for exploring, experimenting and sharing live cinema.

Live cinema is a beautiful grey area between film, video, synaesthetic multi-media and abstract storytelling. Using cameras, video projectors, overhead projectors, computer controlled lighting and select live musical instruments we will experiment with this medium in a casual, but technical, setting. Artists already working in the medium are invited to share their work and artists just starting to work in the medium, or simply curious, are invited to play hands-on with working equipment.

Prerequisite:

Required Materials: Max + collaboratively provided by M+T+C and community: projectors, midi-keyboards, DMX lights, controllable LEDs, lightbulbs

CTE 691 ♦ Max/MSP/Jitter for Live Performance and Installation

Instructor: Sue Slagle. 2-days. 3-hour quarterly sessions.

A place for exploring, experimenting and sharing live cinema.
An open-ended workshop for students that want to build an interactive installation or live performance instrument. Fundamentals of the programming environment will be taught along side critical analysis and reverse engineering of existing work. Additional collaborators will teach relevant hardware (arduino, raspberry pi, etc) and software (processing, ableton live etc.). The goal is to allow artists to develop a longer term instrument, machine or installation that requires learning, experimentation, iteration and opportunities to present the work to the public. Quarterly or semi-annual performances will be planned to showcase work and provide the real-life environment that work needs to be tested in.
Follow-up quarterly (3 hours) in Lab

Prerequisite: Previous experience with sound and video.

Required Materials: Max/MSP installed on laptop. Flexible, ideally control interfaces, arduino, basic sensors, external video cameras

DSI Data, Systems, and Complexity: Insights, Interpretations, and Visualisation

DSI 210 ♦ Prediction, Persuasion, and Power

Instructor: Nandini Ranganathan. 10 hours. 1 weekend.

In order to navigate a complex world saturated with poll numbers, metrics, and data, we need to be able to critically interpret quantitative claims and assertions. In this course, we study the intersection of mathematics, society, politics and power. We investigate strategies and decision-making, and the gathering, interpretation, and analysis of quantitative information in the context of political and social systems, exploring how quantitative data can be used to inform, persuade, manipulate and mislead. We inquire into assumptions, methodology, and concepts of ambiguity, precision, bias, and error. Most importantly, we explore the dark side of bad mathematics — the skillful misuse of numbers, deceptive statistics, and data visualizations in order to manipulate and mislead. Topics covered include probability, statistics, games and decision theory, polling and surveys, voting systems and apportionment, interpretations in the media, and applications to society.

Prerequisite: None

Required Materials:

DSI 310 ♦ Data and Society

Instructor: Douglas Hanes. 6 hours (one day).

News sites and popular media are replete with reports of health and sociological research results, supported by complex analysis of data. Some of these claims seem insightful, but others appear more dubious; often results even appear to contradict one another. Some mistakes are due to more overt biases; but often misstated results accrue from the fundamental nature of analytical methods. Some misinterpretations accrue when researchers collect a large amount of data on each subject, analyze in several different plausible ways, and present only their "best" results as authoritative. But there are other, more subtle decisions made in any analysis. In this workshop, we will present some of the basic notions of data analysis and discuss how choices about research design, analytical models, interpretation of results, and publication can lead journalists and readers to overstate the certainty of scientific knowledge.

Prerequisite: None

Required Materials:

DSI 320 ♦ Introduction to R

Instructor: Meenakshi Rao. 4 hours.

R is widely used by scientists and statisticians to explore, analyze, and visualize large datasets. This workshop will give you a hands-on introduction to importing a large dataset, manipulating it, as well as simple techniques to explore and visualize this data. We will work with Portland air quality data.

Prerequisite: None

Required Materials: Install R Studio on your laptop (if bringing your laptop to the workshop)

DSI 320 ♦ Introduction to D3

Instructor: Meenakshi Rao. 4 hours.

D3 (https://d3js.org/) is one of the most popular Javascript packages for dynamic visualizations in web browsers today (see http://christopheviau.com/d3list/for examples). It was initially developed by Mike Bostock and others from the Stanford Visualization Group, but is now an open source project. In this hands-on workshop, we will play with two D3 data visualizations: dynamic bar charts (using air quality data), and force-directed graphs.

Prerequisite: None

Required Materials: basic knowledge of HTML (bring your laptop to the workshop)

DSI 320 ♦ Introduction to Leaflet

Instructor: Meenakshi Rao. 4 hours.

Leaflet (http://leafletjs.com/) is an open source Javascript library specifically designed to support interactive maps in web browsers. In our hands-on leaflet workshop, we will map air quality data for the US, and explore how to choose base maps and customized icons to personalize our maps.

Prerequisite: None

Required Materials: Install R Studio on your laptop (if bringing your laptop to the workshop)

DSI 350 ♦ Design Systems: Getting the computer to do the boring bits

Instructor: Scott Murray.

This workshop introduces creative coding as an artistic practice in the context of design systems. Designers are smart humans used to producing visual solutions to articulated problems. Computers are not smart devices, yet very skilled at executing mind-numbingly repetitive activities very quickly. What becomes possible when the computer does what it's good at, and the human retains control of what she's good at?

Prerequisite: Familiarity with visual design principles and terminology

Required Materials: A computer with p5 IDE installed. *Getting Started with p5.js*, MAKE Books.

DSI 410 ♦ Data, Decisions, Prediction: A Primer for Social Justice

Instructor: Douglas Hanes. 10 hours (weekend).

This course focusses on applying concepts of data science to tackle social justice problems with quantitative methodology.
Traditional data analysis techniques focus on testing whether there is a prespecified relationship between a few variables. Do people driving red cars get into more accidents? Let?s gather some data and find out! But with more ample sources of data, the goal may be targeted at predicting the likelihood that a person will be in a car accident, not just from their car's color, but likely from many other factors, as well. In fact, why not try to use all of the information at your disposal? These predictive techniques, of machine learning or data mining, can be quite helpful in finding meaningful hidden patterns and correlations which might not be visible. In this workshop we will discuss the different approaches of data analysis and apply them to some social justice data using the statistics package R

Prerequisite: Some knowledge of statistics would be helpful but not essential.

Required Materials: A laptop with R (free, open-source) installed.

DSI 411 ♦ A Systems Thinking Toolkit

Instructor: Howard Silverman. 7 hours (one day).

Systems thinking is one way of seeing patterns amidst the messiness of life. Patterns give coherence to one's experience, and a systems toolkit of methods, models, concepts, and metaphors can be used to sense and interpret such patterns. We will use these tools to examine social and environmental opportunities and concerns; and they will inform our conversations as we consider and critique strategies for effective action. Essential to this toolkit is the use of visual imagery such as artworks, diagrams, graphs, maps, and doodles. Visual imagery can support the types of facilitations and conversations through which cognitive work is done. Through such cognitive work, we grapple with current realities, compare analogies and distinctions, and imagine or enact new stories. No explicit familiarity with systems thinking is required; this class will serve as both introduction for newcomers and augmentation for old hands.

Prerequisite: No explicit familiarity with systems thinking is required; this class will serve as both introduction for newcomers and augmentation for old hands.

Required Materials: Each participant will need a laptop/tablet, with web access.

DSI 510 ♦ Machine Learning and Big Data

Instructor: Douglas Hanes. 12 hours.

With modern digital applications, it is often easy to gather a lot of data on a given individual or system. Hypothetically, this means that we should know more about that individual; on the other hand, how do we sort through all that data to make predictions or reach conclusions? Machine learning techniques – like best-subset regression, tree-based models, support vector machines, principle components, and clustering – allow one to consider all of the variables at one?s disposal, while still arriving at a relatively efficient predictive algorithm. Deep learning techniques, like neural nets, have the ability to recursively update predictions, in order to hone in on efficient algorithms in unpredictable ways. These algorithms can be used to identify patterns in a data set, or to recognize novel stimuli like sound or images. In this workshop we will present some common machine learning techniques and practice using them to reduce big data sets down to identify understandable relationships. This course is applicable to anyone who wants to harness the availability of big data to gain insights into human behavior.

Prerequisite: DSI 410 or some knowledge of regression.

Required Materials: Each participant will need a laptop.

DSI 511 ♦ Theories of Change

Instructor: Howard Silverman. 7 hours. (one day)

From the personal to the political, we all experience desires for change. But change can be hard. Situations can become stuck. In this workshop we will take a close look at change efforts motivated by organizational, social, and environmental opportunities and concerns. Through a series of discussions and exercises, we will explore, develop, and question theories of how change happens. Participants must bring a sense of purpose. Be ready to co-create a space for collaborative learning. Together, we will critically examine what it means to be effective.

Prerequisite: DSI 411. This class will draw upon a systems thinking toolkit of methods, models, concepts, and metaphors.

Required Materials: Each participant will need a laptop/tablet, with web access.

DSI 520 ♦ Creating Complex Systems using Randomness and Noise

Instructor: Scott Murray.

This workshop explores the aesthetic of randomness. How much is enough? How much is too much? Typically, linear visual systems are less appealing than those that appear more "organic," meaning with structure, but also with variation within structure.

Prerequisite: Comfort with p5, standard programming concepts, and principles of systems design.

Required Materials: One computer per student, p5 IDE installed.

FAB Design + Fabrication

- FAB 330 ♦ Making an Impression: Approaches to Stampmaking
- FAB 330 ♦ Inkless printing and flipbook creation
- FAB 340 ♦ Gearing up for Steampunk
- FAB 340 ♦ Pop-Up Scaled Up
- FAB 341 ♦ Embedding Dynamics
- FAB 341 ♦ Make Your Own Tiny Piano: Shaping Circuit Boards
- FAB 400 ♦ Laser Cut Stencils
- FAB 430 ♦ Mastering the Pen Tool
- FAB 500 ♦ Future Fashion
- FAB 530 ♦ Digital Fabrication with Superfab
- FAB 540 ♦ e-textiles and Wearable Technologies
- FAB 541 ♦ Embroidery, weaving, electronics and creative coding
- FAB 571 ♦ Build Your Own Portable Book Scanner
- FAB 620 ♦ Generative Design and Fabrication
- FAB 650 ♦ Computational Design

FAB 330 ♦ Making an Impression: Approaches to Stamp Making

Instructor: Jesse England. 3 Hours.

Explore three different approaches to making independent devices for printmaking using the laser cutter as a fabrication tool: Wood based rubbing implement, rubber stamp, and laser-exclusive ink matrix stamp. Historical approaches to these printing methods are described and then explored in practice.

Prerequisite: laser cutter training (TECH 170)

Required Materials: Preselected, high-contrast imagery for making into stamps. Laptop computer for image editing and preparation. USB drive for transferring imagery to laser PC.

FAB 330 ♦ Inkless printing and flipbook creation

Instructor: Jesse England. 3 Hours.

Laser engraving affords us the ability to bypass ink as an instrument of record taking, eliminating pesky problems such as ink fading or spillage. And what better exploration of this idea than transmuting your favorite videos into long lasting flipbooks? In this workshop, you will learn how to turn your short video clip (or one provided) into images suitable for placement onto a template for laser etching, cutting, and assembly into a bolt-bound flipbook, impervious to data rot or cloud mismanagement.

Prerequisite: laser cutter training (TECH 170)

Required Materials: Laptop with Adobe Premiere and Illustrator. Bring a 1 to 10 second, high contrast video clip to convert, or use one of the examples provided.

FAB 340 ♦ Gearing up for Steampunk

Instructor: Bennett Battaile. 12 Hours (one weekend).

This workshop will focus on ways to use gears for a Steampunk context, while nevertheless designing them with CAD and making them with a laser cutter. The two primary projects will be a simple orrery showing phases of the moon and an odometer-style counter.

Prerequisite: Laser cutter training (TECH 170)

Required Materials: access to computer with Fusion360 installed (but no experience required). Some plywood.

FAB 340 ♦ Pop-Up Scaled Up

Instructor: Bennett Battaile. 12 Hours (one weekend).

Pop-up books use a variety of ingenious fold designs to generate unexpected motion. This workshop will explore ways to use pop-up and origami style folds in larger systems; for smooth folding action we will use drafting software to design precise layouts and a laser cutter to produce shapes in wood

Prerequisite: laser cutter training (TECH 170)

Required Materials: access to computer with Fusion360 installed (but no experience required). Some plywood.

FAB 341 ♦ Embedding Dynamics

Instructor: Shannon Willis. 3 Hours.

In this course we will go over strategies and skills to successfully embed electronics into sculptures and interactive installations. You will learn helpful skills that will enable you to start creating artwork that can change over time or interact with its audience. The coarse covers important skills like how to solder the wires and connection to create a robust piece that is ready for show time. As well as what to do if Plan A fails, and troubleshooting onsite. We will also go over considerations for creating pieces that hold up to audience expectations while being able to take an occasional beating by overzealous viewers.

Prerequisite: Familiarity with Arduinos helpful

FAB 340 ♦ Make Your Own Tiny Piano: Shaping Circuit Boards

Instructor: Darrell Rossman. 6 Hours.

Circuit boards aren't always square. Learn how to make your own custom-shaped mini instrument. We'll take an existing open hardware design (https://tinycircuits.com/pages/tinypiano), and fit the controls/keys to be wherever you want them on whatever (small) footprint you'd like. This means that we will make circuit boards without actually needing any electronics knowledge. Make the instrument a moon, a star, an octopus, or whatever you can dream up. We'll be using the free software KiCad, so you'll be able to easily play around after (and even before) the workshop on your own. The circuit boards will be professionally printed with OSH Park, a local manufacturer, in their purple colour scheme. We'll then meet again to solder them together by hand.

Prerequisite: Proficiency in any vector-graphics editing software

Required Materials:
KiCad (open source/free software) to be installed on participant computer or MTC-provided computers, PCB manufacturer (OSH Park), electrical components

FAB 400 ♦ Laser Cut Stencils

Instructor: Darrell Rossman. 3 Hours.

Learn to design and laser cut stencils for painting! Stencils cut using a laser cutter can be used for street art, wall painting, canvas painting, and in many other creative situations. Stencils can be designed from scratch or adapted from a photograph or other visual material. Unlike hand-cut stencils reproducing laser-cut stencils is as easy as hitting print. The allows for quick and precise experimentation and iteration of stencils.
In this workshop we will:

1. Review the history of stencil art and works by popular stencil artists.
2. Review common techniques for creation and application of stencils
3. Provide an overview of vector art process and explain how to create stencils for laser cutting using Adobe Illustrator.
4. Create your first laser cut stencil (and weather permitting), spray your first laser cut stencil art.

Prerequisite: Must have completed a laser cutter training at Make+Think+Code (TECH 170) or collaborate with a partner who has. Existing Illustrator and vector experience is very helpful but not required. Students without Illustrator experience should expect to need extra time and patience to complete the workshop.

Required Materials: Participants will need a computer with Adobe Illustrator. Some computers with Illustrator will be available for those without.

FAB 430 ♦ Mastering the Pen Tool

Instructor: Craig Winslow. 3 Hours.

The Pen tool is used in many different programs by designers to create vector logos, graphics, icons, custom type, illustrations, masks for animations, and much much more. It's tricky to get the hang of, but over the course of this workshop, we're going to focus in on mastering this powerful tool. How do I vectorize a raster image? Where do I put beziers for clean curves? How in the heck do I make a letter "S" from scratch? These questions and more will be answered. This course will focus on the pen tool in Illustrator, but we?ll also touch on its slight variations in Photoshop and After Effects. We?ll also explore overall best-practices, hotkeys, and ways to speed up your workflow.
What can I do next?
– Make laser-cut stickers, or engrave your design onto things
– Animate your designs in After Effects
– Export SVGs to animate/modify in code

Prerequisite: Familiarity with Adobe Creative Suite

Required Materials: Adobe Illustrator

FAB 530 ♦ Digital Fabrication with Superfab

Instructor: Andy Powell.

Work with Superfab to learn how to bring your ideas into the physical world. The class will begin with two workshop sessions and progress into developing (5) team based projects. Each project will be centered on developing an original item that can be produced in multiples as a product, utilizing Superfab's inventory of offcut sheet goods (plywoods, composites, etc.) as the primary source of material. Work will culminate in the production of a collection of these items to be presented to the public during Portland Design Week 2018.

Prerequisite:

Required Materials:

FAB 571 ♦ Build Your Own Portable Book Scanner

Instructor: Reid Blomquist.

Build your own book scanning device and learn the basics of NLP (Natural Language Processing) using JavaScript. Break works of literature down into components that can be leveraged to generate beautiful art

Prerequisite: Familiarity with js. Laser cutter training

Required Materials: A laptop.

PS Privacy and Surveillance

- PS 440 ♦ Security and the Internet of Things
- PS 540 ♦ Computer Vision and Surveillance

PS 240 ♦ Security and the Internet of Things

Instructor: Dylan McNamee.

With inexpensive, embeddable full-blown computers like Raspberry Pi and Intel's Edison, and internet-connected embedded systems like the ESP8266 ($ 10 each), it's becoming easier to build things that seamlessly connect to the Internet. This makes it extremely easy to design incredibly powerful, connected and intimate experiences. It also makes it way too easy to build things that can be exploited by hackers. Part of this workshop will explore "who cares"? Another part of the workshop will focus on "what can I do"? If you have an IoT project already done, or in progress, please bring it! If not, we'll provide examples to provide context for you to explore these issues.

Prerequisite: some experience with an IoT platform

Required Materials:

CC Creative Coding

- CC 80 ♦ Creative Coding: Fundamentals of Programming
- CC 160 ♦ Unity: Fundamentals
- CC 220 ♦ Web: Fundamentals
- CC 260 ♦ An Introduction to Unity3D
- CC 280 ♦ The Art of Programming
- CC 290 ♦ Manipulated Media
- CC 300 ♦ Recreating Sol Lewitt in a Digital Era
- CC 301 ♦ Processing for Motion Graphics
- CC 301 ♦ Processing Projects: Dances with Robots
- CC 360 ♦ Building an Immersive Web Gallery
- CC 360 ♦ Building Avatars with Web AR
- CC 360 ♦ Mixed Reality Networks
- CC 361 ♦ Introduction to WebGL with THREE.js
- CC 361 ♦ Making Pretty Things with Math - an Introduction to Shaders
- CC 361 ♦ Making Machines Talk
- CC 361 ♦ Prototyping and Experimenting with VVVV
- CC 361 ♦ Making Machines Talk II
- CC 420 ♦ Generative Art: How to provide structure to randomness
- CC 450 ♦ Algorithmic 3D
- CC 550 ♦ Open Frameworks: Projects
- CC 590 ♦ Max/MSP/Jitter: Projects
- CC 591 ♦ Pure Data: Projects

CC 80 Creative Coding: Fundamentals of Programming

Instructor: Reid Blomquist. 3 hours.

Get a grasp on basics with this Intro to Programming course. We?ll cover a brief history of programming and computational science; and an overview of what the programming landscape looks like today. From there we?ll explore some basic concepts which participants will explore using JavaScript. This course aims to provide you with a grasp on core concepts - and provide guidance as to how to expand on that knowledge outside of the brief intro provided.

Prerequisite: No previous experience necessary.

Required Materials:

CC 160 ♦ Unity: Fundamentals and Interactive Scenes

Instructor: . 3 hours.

This workshop introduces the interface and workflow of the Unity Game Engine through the creation of a simple interactive scene. We will cover importing and arranging 3D objects to build a scene, adding pre-built scripts to create interactivity, and using plugins to allow added functionality — like bringing a Unity scene into virtual reality!

Prerequisite: No previous experience necessary.

Required Materials: A laptop with Unity installed

CC 260 ♦ An Introduction to Unity 3D

Instructor: Reid Blomquist. 12 hours (weekend).

Get a jump start on Unity3d development and C# scripting with this course. Course content is not focused on game development - but instead crafting experiences. You'll learn how to use Unity3d basics — like colliders and basic physics — and even spend time exploring generative art possibilities Unity3d offers.
Prerequisite: Need a basic understanding of programming fundamentals.

Prerequisite: No previous experience necessary.

Required Materials: A laptop with Unity installed

CC 280 ♦ The Art of Programming

Instructor: Nandini Ranganathan. 1 weekend intensive.

An introduction to computer programming within the context of the visual/interactive media. We will use Processing, an open-source multi platform language based on Java and is an ideal gateway to programming, interactivity, and procedural graphics. We will learn the basics of coding, the Processing IDE, and how to approach problem solving with the programming toolkit.

We focus on fundamental concepts and algorithmic thinking, creative problem-solving, 3D modeling, movement, interactive techniques, complexity and generative processes. The emphasis will be on collaboration, problem-solving and projects. The course includes theory, strategies for problem-solving, exercises, projects, and discussions; and culminates in a final research project and presentation. Along the way, we will explore the myriad implications of the digital revolution including privacy and surveillance, data mining, artificial intelligence, evolution, and robotics, and of the reality that our primary means of generating and communicating information, and of interacting with the world is digital. A willingness to engage with, delight in, and be suspicious of technology is essential.

Prerequisite: None

Required Materials: Laptop with the Processing installed.

CC290 ♦ Manipulated Media

Instructor: Sue Slagle. 12 Hours.

Learn what digital signals are actually made of — and how to manipulate them for artistic purposes.
What does video sound like? What does audio look like? In this workshop students will learn what digital signals are actually made of - and how to manipulate them for artistic purposes. Sound will be used as a control signal for a custom array of video filters built in the Max/MSP/Jitter object-oriented programming environment. Pixels, color planes, alpha channels, frequency bands and waveforms will be analyzed, experimented with and forced to interact resulting in recorded video works manipulated directly by sound. Part I will cover fundamentals and introduce the system; Part II will allow for additional exploration and open lab time to create a unique work.

Prerequisite:

Required Materials: Materials Needed: Max/MPS/Jitter

CC 300 ♦ Recreating Sol Lewitt in a Digital Era

Instructor: John Brown. 4 2 hour sessions.

Sol Lewitt's Wall Drawings series spanned four decades of his life and lives on after his passing. His instructions for creating permanent art were essentially an analog program for creating generative art on a very large scale. We will use a Javascript library (P5.js) to recreate his works digitally using projectors, large blank walls, and his meticulous technical steps. Each class we'll break down the instructions of one of LeWitt?s drawings into a simple program, centered on a new programming concept. And at the end, we?ll all project our pieces on the wall in an impermanent impression of his permanent pieces.

Prerequisite: A love of Art.

Required Materials: Blank walls, and a projector or two (or more) (I can provide some), various dongles for connecting to computers, laptop per student (their own or provided)

CC 301 ♦ Processing for Motion Graphics

Instructor: Zack Marlow-McCarthy.

Harness the power of creative coding to augment your animation workflow.

Learn how creative coding can be used to lighten the workload and to create unique effects and assets for your After Effects animation workflow. We will explore examples of processing used to generate assets, filters, masks for use in professional AE motion graphics. Write your own filters for visual effects and glitches, time dilation techniques, or generate elaborate and evolving masks and transitions using the easy to use Processing framework. Bring your own video clips, or work with examples provided, to develop your own unique experiment and show off to the class for critique and advice on next steps to push it further.

Prerequisite: Basic knowledge of Processing

Required Materials: Laptop with the Processing installed.

CC 301 ♦ Processing Projects: Dances with Robots

Instructor: Zack Marlow-McCarthy.

Creating low entry cost, body-driven experiences with the Microsoft Kinect.

In this workshop we'll explore several different paradigms and softwares for working with 3d tracking cameras to create digital experiences that engage the body as an input. This workshop is software and hardware-agnostic, but I will provide setups with Processing IDE and VVVV as well as Microsoft Kinect V1/2 and projectors. We?ll discuss the limitations of the technology as well as look at some examples of work in this field, and then break down into groups to explore different paradigms for incorporating 3d tracking cameras.

Preview of a previous workshop with ballet students (password "ema")

Prerequisite: Basic knowledge of coding. An interest in performance or coding or both.

Required Materials: Laptop with the Processing installed. Bring your own hardware/software of choice, but i will set up a few options in advance.

CC 360 ♦ Building an Immersive Web Gallery

Instructor: Stephanie Mendoza. 3 hours.

Using A-frame we can now build websites which the user steps into. In this class we will be using Open Source Software to build immersive, walk in web galleries to host your art interactively online. Web VR is cross platform- or accessible by any device that can run a modern web browser, including HMDs like the HTC Vive.

Prerequisite: No previous experience necessary.

Required Materials: Laptop with web access, mobile phone

CC 360 ♦ Building AvatARs with Web AR

Instructor: Stephanie Mendoza. 3 hours.

Portals and Avatars can be manifested in the real world through the power of the open web. In this workshop we will be using WebAR to explore augmented and mixed reality experiences with A-Frame and AR.js .

Prerequisite: CC361

Required Materials: Laptop with web access, mobile phone

CC 360 ♦ Mixed Reality Networks

Instructor: Stephanie Mendoza. 3 hours.

This class will be teaching networked, multi-user webVR experiences and uploading them to IPFS, the Inter Planetary File System, in order to persist and distribute your social VR worlds. We will be building on the last two workshops, students will build avatars to represent themselves in the digital world and link those worlds together, visualizing "crowd" presence on the web

Prerequisite: Familiarity with A-Frame, HTML and Javascript.

Required Materials: Laptop with web access, mobile phone.

CC 361 ♦ Introduction to WebGL with THREEjs

Instructor: Zack Marlow-McCarthy.

In this workshop we'll explore THREEjs as a fantastic cross-platform framework for building rich and interactive 3D experiences for the web and mobile. We'll look at examples of what the framework can be used to do, discuss some of its limitations, and get started with some hands-on exercises and tutorials.

I will provide some possible themes and assets to work with to make your own 3D experience. At the end of the workshop we'll share what we've made, help to overcome technical obstacles, to optimize for mobile performance, and give creative feedback to push it further.

Prerequisite: A beginner to intermediate level understanding of javascript.

Required Materials: Laptop with code editor. Twilio account.

CC 361 ♦ Making Pretty Things with Math - an Introduction to Shaders

Instructor: Zack Marlow-McCarthy.

Unleash the power of the graphics card with OpenGL shading language (GLSL)

Being capable of writing shaders is the key to unlocking performance in modern computers and mobile devices. In this workshop we'll work in a simple cross-platform WebGL framework to learn the basics of GLSL shader language. We'll learn about the difference between fragment and vertex shaders, some of the limitations and features of GLSL, how to create uniforms and other run time variables, how to use 3d mesh assets such as normals, positions, and UV maps, how to sample, mix, and work with textures.

We'll look at a variety of quadratic and trigonometric functions to find algorithms for mixing and blending colors to create beautiful, performant graphics. We'll discuss pseudo randomness, and incorporating noise and variation. At the end of the workshop, we'll do a guided project, writing our own simple shaders which we'll show in class for critique and debugging.

Prerequisite: A beginner to intermediate level understanding of javascript.

Required Materials: Laptop.

CC 361 ♦ Making Machines Talk

Instructor: Mike Heavers.

The software and hardware we use is often designed with a rigid structure, and a singular, isolated focus. However, if we can understand the underlying ways through which applications and devices communicate, we can expose a wealth of opportunity for artistic expression and unexpected creativity.

In this class we will explore some of the fundamental methods by which machines communicate, and how these allow us to extend the capabilities of hardware and software beyond the uses their creators intended.

This class will be broken into two sessions. In the first we'll look at how to get various software to integrate with one another, including Ableton Live (sound), Max MSP (video), and Unity (3D).

Prerequisite: A beginner to intermediate level understanding of javascript.

Required Materials: Laptop with code editor.

CC 361 ♦ Prototyping and Experimenting with VVVV

Instructor: Zack Marlow-McCarthy.

The ability to integrate things like voice activated menus and automated text messages to users has long been a staple of online businesses. But it can also be used creatively as well. In this workshop, we?ll look at some of the applications of "cloud communications" with the Twilio API.

Prerequisite: A beginner to intermediate level understanding of javascript.

Required Materials: Laptop with code editor. Twilio account.

CC 361 ♦ Making Machines Talk

Instructor: Mike Heavers.

The software and hardware we use is often designed with a rigid structure, and a singular, isolated focus. However, if we can understand the underlying ways through which applications and devices communicate, we can expose a wealth of opportunity for artistic expression and unexpected creativity.

In this class we will explore some of the fundamental methods by which machines communicate, and how these allow us to extend the capabilities of hardware and software beyond the uses their creators intended.

In the second Session we'll look at how to communicate between devices - doing things like making phones talk to the web, making the web talk to household devices, and making devices that control software applications.

Prerequisite: It is not required that you attend the first session, but it is encouraged! Some experience with any of the software mentioned, a basic understanding of programming, or an idea for a project you want to create, will be helpful.

Required Materials: Laptop with code editor.

CC 420 ♦ Generative Art: How to provide structure to randomness

Instructor: Mike Heavers. 4 hours.

Computers have always been capable of producing random results, and are becoming increasingly capable of making their own rule sets about art, technology, and what is and isn?t possible with code. But it takes humans to provide structure to it all, and make it approachable and relatable. In this workshop, we?ll look at randomness as it relates to generative art - different control structures, and how to tweak results to achieve desired aesthetics. The first session will be more conceptual, and the second will focus more on individual practice.

Prerequisite: Basic understanding of javascript.

Required Materials: Laptop with web access, mobile phone.

CC 450 ♦ Algorithmic 3D

Instructor: Jeremy Rotsztain. 10 hours. (weekend)

This intermediate workshop will explore the fundamentals of programming for 3d animation: coordinate systems, virtual cameras, matrix transformations, meshes, motion paths and particle systems. This workshop will be taught using the Processing language. Prior experience with Processing or an equivalent programming language is required.

Prerequisite: Prior experience with Processing or an equivalent programming language is required.

Required Materials: laptops/PCs with Processing installed.

TECH Technology Fundamentals/Introduction

TECH 70 ♦ Vinyl Cutter: Fundamentals and Training

Instructor: Harry Schneider, Scott Nieradka. 1.5 hours.

Learn how to use, manipulate, and utilize the Roland Camm-1 GX-24 vinyl cutter at PNCA. The workshop will cover file preparation, cutting, and application. We will cover different materials that can be used by the vinyl cutter (including vinyl, rubylith, backed paper, etc,) and how one might use them in their art practice. Everybody will have an opportunity to cut something on the cutter during the training.

Prerequisite: .

Required Materials:

TECH 71 ♦ 3D Printing: Fundamentals

Instructor: Giuliano Bruno. 1 hour.

Learn how to use some of the 3D printers at PNCA. The workshop will cover file preparation, different materials that can be used, and some basic troubleshooting.

Prerequisite: None.

Required Materials:

TECH 100 ♦ Drawing in VR

Instructor: Reese Bowes. 6 Hours.

Three-dimensional drawing and the ability to sculpt in virtual spaces has been made available to the masses this past year and in this workshop we will explore three different applications that allow for building multi-dimensional virtual artworks — Oculus Medium, Quill, MasterpieceVR, Gravity Sketch, and Google Blocks, Poly, and TiltBrush.

Prerequisite: .

Required Materials:

TECH 173 ♦ Laser Cutter Fundamentals and Training

Instructor: Jesse England, Darrell Rossman. 3 Hours.

In this workshop, you will learn how to use the Trotec 300 laser cutter at Make+Think+Code. This machine can etch and engrave a variety of materials, including most types of paper, cardboard, fabric, and acrylic. In addition, most materials up to 3/8" thick can be cut. This machine uses Adobe Illustrator, but vector and bitmap designs can originate from other programs as well. You will also learn about the safety features of the machine and how to cut and engrave different materials safely, and how to clean/prepare the machine for use. materials.
Some experience with graphical editing programs such as Illustrator, Photoshop, GIMP, CorelDraw, and others is a recommended prerequisite but is not required.

Prerequisite: Some experience with graphical editing programs such as Illustrator, Photoshop, GIMP, CorelDraw, and others is a recommended prerequisite but is not required.

Required Materials:

TECH 171 ♦ Creating 3D Assets with Blender

Instructor: Ryan Woodring. 6 Hours.

This workshop is a fast-paced intro to creating digital objects for use in virtual and augmented reality, using the open-source 3D modeling/animation program Blender. We will cover the basic tools for mesh modeling and texturing, with an eye toward the limitations and possibilities of VR/AR. Students will learn to create digital assets that look good and are easy to edit, export, and work with in a variety of animation, 3D printing and AR/VR platforms.

Prerequisite: No previous experience necessary

Required Materials: A laptop with Blender installed

TECH 200 ♦ Drawing in VR II

Instructor: Reese Bowes. 6 Hours.

In this workshop we will build upon the fundamentals visited in Drawing with VR I (TECH100). Advanced topics including sculpting environments, the figure, brush creation, and surface design methods will be explored.
Each student will have the opportunity to create a final piece and further pursue VR drawing/sculpting methods with the assistance of the instructor after the workshop.

Prerequisite: Drawing with VR I (TECH 100), or experience with Oculus Medium, Oculus Quill, Tilt Brush, Gravity Sketch, or another VR drawing application.

Required Materials:

TECH 240 ♦ Introduction to Electronic Deconstruction

Instructor: Darrell Rossman, Jesse England. 3 Hours.

One of the best ways to learn about electronics is to take apart everyday electronic equipment and attempt to understand it and reconstruct it. In this workshop students will take apart and reconstruct random electronic equipment in the spirit of the book "The Way Things Work" by David Macaulay. The equipment can be reconstructed in its original form or reformed into an artwork. Equipment may include computers, stereo equipment, telephones, or anything else electronic. Through this we will learn about the internals of electronic equipment and artistic applications of electronic components.

Prerequisite: No electronics experience required. We highly recommend that participants bring a piece of electronic equipment that they want to take apart. Many pieces of equipment will be available however the experience is best if you bring your own. It should be something that you don?t mind breaking

Required Materials: Phillips head and Flathead screw driver, a TORX screw driver set.

TECH 241 ♦ Arduinos and Microcontrollers: Fundamentals

Instructor: Shannon Willis. 6 Hours.

This is an intensive hands-on introduction to the Arduino platform, a popular and inexpensive micro controller that allows you to connect sensors and make something happen. Think of an Arduino as a mini computer you can then embed into your own projects. If you had ever wanted your work to be viewer responsive this is a good way to start. This crash course will get you started providing you with the technical know how to get started. We will also introduce electronics and soldering, allowing you to turn a prototype into a sturdy and robust project.

Prerequisite: Open to all Skill Levels

Required Materials: ...

TECH 242 ♦ Making Through Breaking

Instructor: Salvador Orara. 3 Hours.

Circuit bending is the explorative process of short-circuiting electronic devices such as children's toys, electronic games, and noise making key chains to create new musical, expressive, and interactive noise and sound generators. The goal of this workshop is to introduce the fundamentals of electronics to individuals with no prior experience in computing or engineering.

Required Materials: An inexpensive electronic music toy, or noise making keychain, or electronic musical instrument, typically found at $.99 stores or second hand stores.

TECH 290 ♦ An In-depth Introduction to Synthesis

Instructor: Justin Patrizi. 6 Hours.

This workshop will explore synthesis as an essential tool for sound design, both in musical elements as well as sound effects and atmospherics. Students will learn the signal flow of synthesizers, from the tone and timbre of oscillators, through filters and other modifiers, as well as the control paths that add dynamics and modulation to the various parameters affecting the sound. VCV Rack, a free virtual modular software package, will be used for these experiments, allowing students to build up their own synth piece by piece, although the theory learned can be applied to other software and hardware alike. The skillset learned here can also easily carry over into affecting other sound sources like guitar or vocals, providing a window into audio and music production as a whole.

Prerequisites: None

Required Materials: Laptop, headphones, VCV Rack software (free; https://vcvrack.com/)

TECH 371 ♦ Sculpting through CAD

Instructor: Reese Bowes. 6 Hours.

This workshop will focus on drawing methods for designers that wish to enter into the world of industrial and product design but have been limited by the assumed hurdles of computer aided design software. The approach discussed will be a form-first sculptural method that students interested hands-on form-making will be able to engage with quickly.

Prerequisite: .

Required Materials:

TECH 390 ♦ An Introduction to MIDI

Instructor: Shawn Trail. 2 Hours.

In this 2hour workshop MIDI is demystified - from basic nomenclature to an intuitive overview of the framework, MIDI will be examined and explained with practical examples of how to use as it applies to visual artists.

Prerequisite: None

Required Materials: Laptop with Puredata installed.

TECH 430 ♦ Building and Demolishing Walls in Blender and Nuke

Instructor: Ryan Woodring. Four 3 Hour Sessions.

3D Modeling and Visual Effects

Digital destruction continues to be one of the main exports of American cinema. We've destroyed our own cities in hundreds of unique ways to tell stories of fear, hubris and hope. In this workshop we'll mine our explosive past for inspiration and use recent national discussions on wall-building for content. We will build 3D models of walls with the intent of exploring Blender's built-in physics engine in order to realistically demolish them. We will integrate our 3D renders into Nuke, a film industry staple, in order to create realistic scenes. If you've been wondering about the basic principles of vfx, this broad survey will cover topics such as matte painting, camera tracking, and more. We'll focus both on learning new software and hold group discussions about the implications of building and destroying in real and virtual space.

Prerequisite: None. This is a beginners level 3d modeling workshop. A basic understanding of animation is helpful but not necessary.

Required Materials: Nuke (or aftereffects), Blender, Mouse, Mouse Pad, External Hard drive or Cloud

TECH 470 ♦ Advanced Laser Engraving: Rotary Attachment

Instructor: Darrell Rossman. 4 hours

If you've ever seen a champagne flute with engraved initials, chances are it was done with a laser. Using the rotary attachment, lasering is not just confined to the flat. Learn to set up the rotary attachment jig and we'll engrave glass cups or mugs with simple artwork and/or text.

Prerequisite: Attendees must have completed a laser training tutorial session (TECH 170) at MTC.

Required Materials: Darrell to provide glassware

TECH 471 ♦ Advanced Laser Engraving: Rotary Attachment

Instructor: Darrell Rossman. 4 hours

Engraving on metal with lasers? Totally. Laser markings on specific metals can be some of the toughest engravings around, and some of the most beautiful. In this workshop, we'll take a photo or artwork of your choice (some instructions will apply) and engrave it into anodized aluminum. We'll also use a special marking material to engrave a simple text/graphic onto the surface of a small stainless steel blank.

Prerequisite: Attendees must have completed a laser training tutorial session (TECH 170) at MTC.

Required Materials: Cermark tape, flat squares of stainless steel, anodized aluminum sheets

TECH 530 ♦ Disappearing Acts

Instructor: Ryan Woodring. Four 3 Hour Sessions.

Visual Effects

This 12 hr workshop will cover different visual effects strategies for removing objects from videos. Through this technical exploration of vfx software Nuke and After Effects you will 2D and 3D camera tracking, matte painting, compositing and rotoscoping. We will discuss both how post production studios and individual artists have used these methods to cover up, delete and appropriate.
Laptops and installed software provided by Make+Think+Code.

Prerequisite: No previous experience required. General comfort with Apple laptops suggested.

Required Materials: Bring 3 button mouse and pad and/or a Wacom tablet and pen if you have.

PDE Professional Development and Education

PDE 250 ♦ Wordpress: Build Your own Website/Blog

Instructor: Shannon Willis. 6 Hours.

Wordpress is a free blogging and website building framework In this course you will learn how to create a website using Wordpress that you can easily change and customize to your own likes. Wordpress is a flexible platform allowing you to change your website and add free content easily. No coding background is needed, this class was designed for Wordpress and web design novices. Come to class prepared with an idea of a website you would like to create, along with any photos and content.

Required Materials:

PDE 420 ♦ From minimal to enterprise: How to choose the best technologies for your online project

Instructor: Mike Heavers. 3 Hours.

While a simple website can be put online with just an html file and a web hosting account, a complex website will have a multitude of technologies all working in tandem to create an optimal experience. In this workshop we?ll look broadly at everything from hosting services (Amazon S3, Digital Ocean), to frameworks (React) to content management systems (Squarespace Wordpress), to animation frameworks (Pixi, Tweenmax), to to enterprise level technologies (load balancing, testing), and how to determine how much is enough for your own project. The latter part of the class will be reserved for answering questions related to the participants' own projects.

Prerequisites: None, but it is helpful to have a project in mind that you are building or want to build. A basic understanding of how a website is made and put online is helpful as well.

Required Materials:

PDE 501 ♦ Electronic Installations

Instructor: Sue Slagle, Jesse England. 3-hour session.

New media demands all new methods for presentation and installation particularly in fine art contexts. Mounting a flat panel on the wall and running a video loop is not enough; the entire installed object and context must be considered. In this workshop we will explore the full spectrum of ways that new media and electronic artwork can be installed in formal contexts such as galleries and arts institutions.
We will discuss the nature of electronic art objects and how to approach materializing work into objects.; Explore common technologies used in electronic installations such as media players, display drivers, programmable lighting, and power control; explore primary and alternate exhibition opportunities such as vacant spaces and pop-up installations.
In the second session, participants will create an original concept for an electronic art object in small groups or individually. Concepts can be adaptations of existing work. Finally we will conclude with basic guidance for how to begin pursuing opportunities to install your work in these contexts including a discussion of common expectations and requirements of institutions for installations including longevity, insurance, and costs as well as maintenance and practical considerations for managing installations over longer periods.

Prerequisite: .

Required Materials: A laptop.

PDE 580 ♦ 21st Century Teaching: Creative Confidence

Instructor: Michael Hyde.

This class is for: undergraduates thinking about a career in teaching, pre-service teachers, K-12 teachers or any and all subjects (art, humanities), STEM/STEAM teachers, program coordinators, integration specialists, administrators, librarians, non-profits, maker educators and anyone who works with youth.
Teaching K-12 students in the 21st century classroom requires teachers to be innovators, instigators, and "guides on the side" who model the creativity, entrepreneurship, and risk-taking that is increasingly required of our students. Add testing and grading, educational technology, growth mindsets, STEAM integration, design thinking and the maker movement to the mix, and it can be just as easy to feel overwhelmed as it is to feel inspired. How to make sense of all these expectations, and to make time for them requires some ... creativity ...
Using methods adapted from the *Teaching For Artistic Behavior* framework, you will learn to connect with and develop your own creative confidence that will enhance your teaching. You will generate lessons, material and exercises that you can start using right away with your students (and yourself) to build creative confidence, habit, and divergent thinking skills regardless of grade level or subject. Teaching is, by nature, an empowering and creative profession. This course will give you the time, space, and tools to teach like an artist.

Prerequisite: .

Required Materials:

CRE Creative Entrepreneurship

- CRE 430 ♦ Creative Wireframing (Story Boarding (UX)
- CRE 510 ♦ The Price is Right: Setting Rates as a Creative Freelancer
- CRE 511 ♦ Data and Research: Analyzing Trends and Audience
- CRE 530 ♦ Creative Startup Lab: From Idea to Prototype
- CRE 630 ♦ Creative Startup Lab: Prototype to Launch
- CRE 631 ♦ Market Differentiation and Brand Story
- CRE 680 ♦ Crowdfunding your Project

CRE 430 ♦ Creative Wireframing (Story Boarding UX)

Instructor: Matt Rhoades. 4-hour session.

How to think beyond the code and into the effect consumers will have on the final product. Simplicity. Amplification. Voice.

User experience is a term that has been used a lot in recent years. This class will focus on the true meaning-how the code directly effects the user. There is an entire chapter of strategic development and brand awareness that needs to be written before any coding can be created. This strategy and brand awareness, alongside usability, are key ingredients to creating a successful product (or software or app).

This class will start with a 100,00 ft perspective of human interaction with the digital world; past and current. Other activities will include:

Design Thinking – Exercises on post-it notes.

Story Boarding – Quick ideation with a focus on concept direction and goal.

Branding 101 – The external influences(ers).

Iconography basics – Conceptuality through quick ideation.

Fit + Flow – How do the actions flow seamlessly together.

Exercises will start at 100,000 ft and slowly burrow down to simple executable ideas and concepts that reflect today?s unique UX needs.

Prerequisite:

Required Materials: All necessary materials will be provided; templates and case studies. Student will just need to bring their creativity and unique experiences.

MATH Mathematics, Economics, Data Science

- MATH 180A ♦ Navigating the Universe: A Primer in Trigonometry
- MATH 210E ♦ Algorithmic Thinking
- MATH 270A Steampunk Machines
- MATH 280A ♦ Geometry and the imagination
- MATH 280C ♦ Cardboard Cryptography
- MATH 281C ♦ Cryptology: The Science of Secret Writing
- MATH 381A ♦ Geometry, Paperfolding, and Popups
- MATH 570A ♦ Geometric Folding and Origami: Applications to Fabrication, Robotics, and Engineering

MATH 210E ♦ Algorithmic Thinking

Instructor: Salvador Orara. 4 3-hour workshops

This class will focus on non-technology based approaches to exploring algorithmic thought. Group and individual based projects that simplify principles of algorithms without the use of computers through physical processing systems.
In-class exercises 1 individual project and 1 2-person final project.

Required Materials: Mark making tools: markers, pens, pencils, paper, foam-core, tape, crayons, charcoal, paint (tempera is cheapest), rolls of craft paper (white or brown).

MATH 280A Geometry and the Imagination

Instructor: Nandini Ranganathan. 3 weekends focussed on different topics.

Using the visual imagination to illuminate the geometry of space, we investigate the concepts of infinity, dimension, curvature, topology and symmetry. We begin with a study of Euclid's postulates of geometry, which transformed our intuitive understanding of space into an abstract logical theory that provided a language for architecture, physics, and astronomy. We explore the ongoing relationship between visual representations and the theories of space developed in mathematics and physics. Two important events that transformed our understanding of the structure of space were Gauss's discovery of curved space at the beginning of the 19th Century and Poincare's investigations at the end of the century into the geometry and topology of a non-Euclidean space. The resulting explorations into the notions of dimension, infinity, and symmetry provided descriptions of fantastic, impossible and complex spaces with enormous consequences for the physics of space and time, and for our understanding of cosmology and the shape of the universe. Topics covered can include symmetry and tiling; infinity and complexity; fractal growth; curves and surfaces; hyperbolic geometry; dimensions, folding and polyhedra; curvature; and topology

Prerequisite: .

Required Materials:

MATH 280C ♦ Cardboard Cryptography

Instructor: Dylan McNamee.

We rely on cryptography to keep our identities, accounts, and credit cards secure on the Internet, but what is it, really, and how does it work? In this class, we'll learn about how a series of increasingly sophisticated cryptographic systems work, leading up to the famous Enigma used by Germany during WWII. We'll build and use functioning cardboard models of these cryptographic systems, then we'll discuss how modern cryptographic systems work, and how they are assembled to keep your gmail account secure, and your credit card safe when you purchase online.

Prerequisite:

Required Materials:

MATH 281C Cryptology: The Science of Secret Writing

Instructor: Nandini Ranganathan. 3 weekends. intensive.

A study of the art and science of encrypting, concealing, and hiding information; of the historical and political contexts; and all the myriad consequences. We investigate ancient manuscripts, mysterious scripts, secret communications over time and conclude with discussion of current and future methods of encryption (RSA and quantum cryptography). Our discussions will focus on the underlying methods, concepts, and principles; the history of secret communications in literature, religion, politics, and war; and on the modern world of digital communication, and issues of privacy and surveillance. The underlying mathematical concepts include methods of probability and combinatorics to analyze language, sequences and recurrence relations, and techniques from number theory, algorithms, computational complexity, and information theory.

SCI Science including Physics, Electronics, Materials, Modelling Systems, Cognitive Science and Psychology

SCI 370A Motion, Force, and Time

Instructor: .

A study of our changing understanding of the laws of motion, the forces that govern them, and the phenomena of space and time. We also study the various methods and models developed to model transformation and changing physical phenomena. We investigate the enormous transformation of our understanding of the physics of the universe that progressed in parallel to changes in our understanding of the geometry of space. Our discussions will focus on the underlying mathematical concepts, the historical and political context, applications and consequences.

Prerequisite: .

Required Materials:

SCI 390A The Phenomenon of Sound

Instructor: Nandini Ranganathan. Weekend (12 hours).

An investigation of the various physical phenomena that we perceive focussing on an exploration of the phenomenon of sound, its creation, behaviour, and its relationship with the space it inhabits.

Prerequisite: None.

SCI 391A The Science of Light

Instructor: Nandini Ranganathan. weekend.

The main focus of the course is our changing understanding of the phenomenon of light. We study the laws of reflection, refraction, diffraction and scattering and the resulting effects and phenomenon in nature and the relationship between light and vision.

Prerequisite: None.

SCI 392A Light Technologies and Electromagnetic Waves

Instructor: Nandini Ranganathan. weekend.

The main focus of the course is our changing understanding of the phenomenon of light. We explorie the amazing technologies that emerged (lasers, electronics, sensors, leds...) as a from Maxwells' theory of the field in 1865, which provided a framework and explanations for electromagnetic phenomena including light and set the stage for Bohr's model of the atom and the resulting quantum theories. We analyze the implications of these theories, of the transition from from empiricism to uncertainty, and of the entangled relationship between the observer and the observed.

Prerequisite: None.

CULT Technology and Society

CULT 400 ♦ Drawing and Technology

Instructor: Reese Bowes.

An attempt to understand art practices and how they relate or can relate to software, hardware, mechanics, problem solving in general ? this workshop aims to create a bridge between thinking and problem solving processes involved with design generation and art production and aims to create a bridge between these and the kinds of problem solving we find in software and coding. How do we use artful and observational methods to instruct and inform how we can also approach problems that exist in technology?

Prerequisite: Some form of visual arts training/experience or software development experience

CULT 480 ♦ Technology and Evolution

Instructor: Reese Bowes.

An exploration into how our designed devices and interfaces are changing our cognitive patterns and behaviors. How do we design for the future of mankind? How do we understand human beings and our thinking processes in order that we may design toward enabling and facilitating our own evolution?

Prerequisite: None.

CULT 580 ♦ Symposium on Technology, Society, and Culture

Instructor: . 6 3-hour sessions.

The *Symposium on Technology, Society, and Culture* promotes an exchange of questions, ideas, and experiences in an effort to understand some of the critical problems of our age related to technology. Participants engage in a vigorous discussion and debate based around significant contemporary works (books, films, articles, and plays) that the impact, applications, and implications of living in a connected and networked digital world saturated with information and immersed in technology. The symposium is guided by two or three faculty members representing different disciplines and includes several visiting panelists and speakers. *Sessions:* Technology and ...
+ Privacy, Surveillance, Security; + Artificial intelligence/life, emergence + Impact on society: social justice, labour, revolution, politics... + Education + Energy and environment + Culture

Prerequisite: Senior/Graduate student/Professionals.

MTC Make+Think+Code Advanced Institutes

Make+Think+Code Institutes include between one and three weeks of a series of short intensives workshops (with multiple parallel tracks and themes); time for dialogue and conversations (formal and informal); lectures and panel discussions; opportunities for experimentation, play, presentation, and feedback. We will have field trips to relevant local organisations and businesses (for inspiration — as fieldwork and community building), as well as a retreat for inspiration and brainstorming. The final week will focus on collaborative cross-disciplinary team projects (or a design/build challenge). Our institutes focus on using the powerful strategies of creativity, design-thinking, and emerging technology to create imaginative and impactful applications and responses to issues urgent to our local and global communities. These institutes provide opportunities for building long-term collaborations and developing fluency in emerging technologies and strategies to apply your skills to advanced and urgent problems.

- MTC 230 ♦ STEAM Summer Institute
- MTC 600 ♦ Creating Immersive Installations and Experiences
- MTC 610 ♦ Prediction, Persuasion, and Power: A Data Science Institute
- MTC 640 IoT: ♦ Building a Smart Connected World: an IoT Institute
- MTC 660 ♦ Hacking Perception: An Institute in Mixed Reality
- MTC 680 ♦ Make+Think+Teach: A Professional Development Institute for STEAM Educators

STEAM Workshops for grades 6 — 13

- STEAM 110 ♦ Games and Puzzles
- STEAM 111 ♦ Patterns and Symmetries
- STEAM 130 ♦ Popup books
- STEAM 140 ♦ Introduction to Interactive LED Art
- STEAM 141 ♦ Electronics and Robotics
- STEAM 160 ♦ Creating Virtual Worlds
- STEAM 170 ♦ Making Things Fly: Airplanes, Drones and other mysterious Flying Objects
- STEAM 171 ♦ Kinetic Sculptures
- STEAM 180 ♦ Think It/Build It
- STEAM 190 ♦ Cymatic Marbling Painting Workshop

STEAM 140 ♦ Introduction to Interactive LED Art

Instructor: Myles de Bastion.

Through hands-on fabrication and basic electronics and programming, students will gain an understanding of the fundamental building blocks used to design, assemble and bring to life an Interactive LED art installation.
- Learn electronic fundamentals through basic wiring and electrical connections.
- Gain fabrication experience by Constructing LED shapes using plastic/mesh scaffolding.
- Become familiar with art-tech coding/programming by applying LED mapping and interaction rules.

Prerequisite: No prior knowledge is assumed.

Required Materials:

STEAM 190 ♦ Cymatic Marbling Painting Workshop

Instructor: Cymaspace/Eric Buchner.

Explore the effect of sound vibrations on matter (also known as the study of Cymatics) in a hands-on, interactive workshop that is suitable for all ages, interests and abilities. Workshop participants will transfer images of sound onto paper by manipulating water bath stations affected by the phenomena of real-time sound-vibrations whilst simultaneously employing traditional oil paint marbling techniques.

Prerequisite: .

Required Materials:

+ MAKE+THINK+CODE: THE FUTURE OF LEARNING +

+ **MAKE+THINK+CODE** is a technology-focussed lab at the Pacific Northwest College of Art that brings together members of Portland's vibrant creative, tech, civic, and educational communities to explore the powerful role that creativity and technology play in the search for imaginative and impactful solutions to complex and urgent problems.

+ **MAKE+THINK+CODE** emphasizes the skills of the future — fluency with emerging technologies, creativity, design-thinking, research and collaboration, preparing a diverse community to actively engage as citizens and to succeed in our growing regional and national creative technology industries. We emphasize a 21st Century model of education that supports life-long learning and fosters a culture of inclusion, emphasizing collaborations and partnerships between and across industry, government, and academic and cultural institutions to create a supportive ecosystem of individuals and organisations. We are passionate about increasing equity in and access to technology and design industries. Our programming supports an inclusive community of learners from a variety of disciplines, cultures, generations, experience, and expertise and we strongly believe this diversity leads to more exciting and impactful applications and ideas.

+ Our programming emphasizes experimentation with emerging technologies, (digital) fabrication and prototyping, creative coding, data science, systems-thinking, the internet of things and smart technologies, creative entrepreneurship, STEAM pedagogy, and privacy and security. We offer workshops, institutes, symposia, and hackathons/challenges directed at a diverse professional community excited to design and create meaningful connections, prototypes, and experiences. Our curriculum is interdisciplinary, project-based, and emphasizes collaborative problem-solving in cross-disciplinary teams.

+ The Lab provides the catalyst to build and foster a culture of peer-learning, cross-disciplinary collaborations, and mentoring and ensures access to technology and expertise to the community. **MAKE+THINK+CODE** will develop a diverse and inclusive community of students and professionals fluent in current and future technologies prepared to succeed and thrive in a networked world with ever-changing and ubiquitous technology.

+ In addition to our work in higher education, we (in collaboration with community partners) on design and host exciting STEAM programs for K-12 students as well as professional development institutes for educators.

+ FIND US

- email mtc@pnca.edu
- web pnca.edu/makethinkcode
- github MakeThinkCode
- MakeThinkCode
- /Instagram @MakeThinkCode #MakeThinkCode

Make + Think Code

Make +Think +Code

Workshops

Spring 2018

Generative Art: Creative Coding

CC 280 **Art of Programming**
Sat Jan 20. 10:00AM – 5:00PM. Sun Jan 21. 1:00PM – 5:00PM

CC 300 **Recreating Sol Lewitt in a Digital Era**
Tue Jan 30. Thu Feb 15. Tue Feb 27. Thu Mar 13. 6:30PM – 8:30PM

CC 360 **WebVR/AR: Building an Immersive Web Gallery**
Tue Feb 6. 6:00PM – 9:00PM

CC 301 **Processing for Motion Graphics**
Thu Feb 8, 22. 6:00PM – 9:00PM

CTE440 **The Walls Have Eyes: Live Video as a Control Signal**
Sun Feb 11. 10:00 AM – 5:00PM

CC 360 **WebVR/AR:Building Avatars with WebAR**
Tue Feb 13. 6:00PM – 9:00PM

CC 360 **WebVR/AR: Mixed Reality Networks**
Tue Feb 20. 6:00PM – 9:00PM

CTE461 **Realtime Skeleton Animation with Unity**
Sun Feb 25. 1:00 – 5:00PM

CTE 450 **Painting with Bitmaps**
Sat, Sun Mar 24 –25. 1:00PM – 6:00PM

CC 301 **Processing Projects: Dances with Robots**
Sat Mar 31. 10:00AM – 5:00PM

CC 361 **Making Machines Talk I**
Wed Apr 4. 6:00PM – 9:00PM

CC 361 **An Introduction to WebGL with THREE.js**
Tue, Thu Apr 10, 12. 6:00PM – 9:00PM

CC 361 **Making Machines Talk II**
Wed Apr 11. 6:00PM – 9:00PM

CC 361 **Making things Pretty with Math - An Introduction to Shaders**
Sat Apr 21. 10:00AM – 5:00PM

CC 361 **Prototyping and Experimenting with VVVV**
Sat Apr 28. 10:00AM – 5:00PM

Enchanted Objects: Electronics, Sensors and Microcontrollers, IoT

CTE 393 **Building Digital Instruments I: Intro to Sound Control**
Sat, Sun Jan 13 – 14. 10:00AM – 5:00PM

CTE440 **The Walls Have Eyes: Live Video as a Control Signal**
Sun Feb 11. 10:00 AM – 5:00PM

TECH 241 **Arduinos and Microcontrollers: Fundamentals**
Sat Feb 24. 10:30AM – 4:30PM

FAB 341 **Embedding Dynamics**
Wed Mar 21. 6:00PM –9:00PM

CTE 493 **Building Digital Instruments II:Raspberry Pi Instrument Design**
Tue Wed. Mar 27 – 28. 10:00AM – 5:00PM

FAB 341 **Make Your Own Tiny Piano: Shaping Circuit Boards**
Sat Mar 31. 10:00AM – 5:00PM

CC 361 **Making Machines Talk I**
Wed Apr 4. 6:00PM – 9:00PM

CC 361 **Making Machines Talk II**
Wed Apr 11. 6:00PM – 9:00PM

Hacking Perception: Virtual - Mixed - And Augmented Reality

CTE 360 **Creating for Mixed Reality**
Wed Jan 17 – May 09. 3:00PM – 5:45PM

TECH 100 **Drawing in Virtual Reality**
Sun Jan 28. 10:30AM – 4:30PM

CC 360 **WebVR/AR: Building an Immersive Web Gallery**
Tue Feb 6. 6:00PM – 9:00PM

TECH 200 **Drawing in Virtual Reality II**
Sat Feb 10. 10:30AM – 4:30PM

CC 360 **WebVR/AR:Building Avatars with WebAR**
Tue Feb 13. 6:00PM – 9:00PM

CC 260 **An Introduction to Unity3D**
Sat Sun Feb 17 – 18. 10:00AM – 5:00PM

CC 360 **WebVR/AR: Mixed Reality Networks**
Tue Feb 20. 6:00PM – 9:00PM

CTE 430 **Interaction in a Spatial Context I: Fundamentals**
Sat Sun Mar 3 – 4. 10:00AM – 5:00PM

TECH 173 **Creating 3D Assets with Blender**
Sat Mar 17. 10:00AM –5:00PM

CC 160 **Unity: Fundamentals**
Tue Apr 3. 6:00PM - 9:00PM

CTE 530 **Interaction in a Spatial Context II: Beginning Design**
Sat Sun May 5 – May 6. 10:00AM – 5:00PM

Visual Effects and Motion Graphics

TECH 460 **Building and Demolishing Walls in Blender and Nuke**
Tue Thu Jan 16, 18, 23, 25. 6:00PM – 9:00PM

CTE 300 **Augmenting the World with Light: Projection Mapping**
Wed Jan 17. 6:00PM – 9:00PM

CTE 392 **Projection Hack: Immersive collaborative Light Collage**
Fri Jan 19. 6:00PM – 9:00PM

CRE 430 **Creative Wireframing (Story Boarding UX)**
Sun Feb 4. 1:00PM – 5:00PM

CC 300 **Recreating Sol Lewitt in a Digital Era**
Tue Jan 30. Thu Feb 15. Tue Feb 27. Thu Mar 13. 6:30PM – 8:30PM

CC 301 **Processing for Motion Graphics**
Thu Feb 8, 22. 6:00PM – 9:00PM

CTE461 **Realtime Skeleton Animation with Unity**
Sun Feb 25. 1:00 – 5:00PM

TECH 530 **Disappearing Acts**
Thu Mar 1, 8, 15, 22. 6:00PM – 9:00PM

CTE 450 **Painting with Bitmaps**
Sat, Sun Mar 24 –25. 1:00PM – 6:00PM

CC 361 **An Introduction to WebGL with THREE.js**
Tue, Thu Apr 10, 12. 6:00PM – 9:00PM

CC 361 **Making things Pretty with Math - An Introduction to Shaders**
Sat Apr 21. 10:00AM – 5:00PM

CC 361 **Prototyping and Experimenting with VVVV**
Sat Apr 28. 10:00AM – 5:00PM

Talking to Machines: Web/Mobile

CC 300 **Recreating Sol Lewitt in a Digital Era**
Tue Jan 30. Thu Feb 15. Tue Feb 27. Thu Mar 13. 6:30PM – 8:30PM

CC 360 **WebVR/AR: Building an Immersive Web Gallery**
Tue Feb 6. 6:00PM – 9:00PM

CTE440 **The Walls Have Eyes: Live Video as a Control Signal**
Sun Feb 11. 10:00 AM – 5:00PM

CC 360 **WebVR/AR:Building Avatars with WebAR**
Tue Feb 13. 6:00PM – 9:00PM

CC 360 **WebVR/AR: Mixed Reality Networks**
Tue Feb 20. 6:00PM – 9:00PM

CTE461 **Realtime Skeleton Animation with Unity**
Sun Feb 25. 1:00 – 5:00PM

CC 361 **Making Machines Talk I**
Wed Apr 4. 6:00PM – 9:00PM

FAB 571 **Build Your Own Portable Book Scanner**
Sat Sun Apr 7 – 8. 10:00AM – 5:00PM

CC 361 **An Introduction to WebGL with THREE.js**
Tue, Thu Apr 10, 12. 6:00PM – 9:00PM

CC 361 **Making Machines Talk II**
Wed Apr 11. 6:00PM – 9:00PM

CC 361 **Making things Pretty with Math - An Introduction to Shaders**
Sat Apr 21. 10:00AM – 5:00PM

CC 361 **Prototyping and Experimenting with VVVV**
Sat Apr 28. 10:00AM – 5:00PM

Making Evolved: Design+Fabrication

TECH 170 **Laser Cutter and Engraver: Fundamentals**
Wed Jan 10 5:30PM – 8:30PM
Sun Jan 14. 2:00PM – 5:00PM
Wed Jan 17 5:30PM – 8:30PM

FAB 530 **Digital Fabrication with Superfab**
Jan 20, Feb 3. 9:00AM - 1:00PM + Team sessions

CRE 430 **Creative Wireframing (Story Boarding UX)**
Sun Feb 4. 1:00PM – 5:00PM

TECH 100 **Drawing in Virtual Reality**
Sun Jan 28. 10:30AM – 4:30PM

FAB 330 **Making an Impression: Approaches to Stamp Making**
Wed Feb 7. 6:00PM –9:00PM

FAB 330 **Inkless Printing and Flipbook Creation**
Wed Mar 7. 6:00PM –9:00PM

TECH 200 **Drawing in Virtual Reality II**
Sat Feb 10. 10:30AM – 4:30PM

FAB 340 **Gearing up for Steampunk**
Sat Sun Feb 17 –18. 10:00AM – 5:00PM

FAB 340 **Pop-Up Scaled Up**
Sat Sun Mar 10 –11. 10:00AM – 5:00PM

TECH 173 **Creating 3D Assets with Blender**
Sat Mar 17. 10:00AM –5:00PM

FAB 341 **Embedding Dynamics**
Wed Mar 21. 6:00PM –9:00PM

FAB 341 **Make Your Own Tiny Piano: Shaping Circuit Boards**
Sat Mar 31. 10:00AM – 5:00PM

TECH 370 **Advanced Laser Engraving: Rotary Attachment**
Sat Apr 7. 1:00PM – 5:00PM

FAB 571 **Build Your Own Portable Book Scanner**
Sat Sun Apr 7 – 8. 10:00AM – 5:00PM

TECH 370 **Advanced Laser Engraving: Metal Marking**
Sat Apr 21 1:00PM – 5:00PM

Making Evolved: Laser Cutter and Engraver Projects

TECH 170 **Laser Cutter and Engraver: Fundamentals**
Wed Jan 10 5:30PM – 8:30PM
Sun Jan 14. 2:00PM – 5:00PM
Wed Jan 17 5:30PM – 8:30PM

The following workshops all require TECH 170 as a prerequisite.

FAB 330 **Making an Impression: Approaches to Stamp Making**
Wed Feb 7. 6:00PM –9:00PM

FAB 340 **Gearing up for Steampunk**
Sat Sun Feb 17 –18. 10:00AM – 5:00PM

FAB 330 **Inkless Printing and Flipbook Creation**
Wed Mar 7. 6:00PM –9:00PM

FAB 340 **Pop-Up Scaled Up**
Sat Sun Mar 10 –11. 10:00AM – 5:00PM

TECH 370 **Advanced Laser Engraving: Rotary Attachment**
Sat Apr 7. 1:00PM – 5:00PM

FAB 571 **Build Your Own Portable Book Scanner**
Sat Sun Apr 7 – 8. 10:00AM – 5:00PM

TECH 370 **Advanced Laser Engraving: Metal Marking**
Sat Apr 21 1:00PM – 5:00PM

Data Science, Systems, and Complexity

DSI 210 **Prediction, Persuasion, and Power**
Sat Jan 27. 10:00AM – 5:00PM. Sun Jan 28.1:00PM – 5:00PM.

DSI 310 **Data Science and Society**
Sun Feb 11. 10:00AM – 5:00PM.

DSI 320 **Intro to R**
Sun Feb 25. 1:00PM – 5:00PM.

DSI 411 **A Systems Thinking Toolkit**
Sun Mar 18. 10:00AM – 5:00PM.

DSI 320 **Intro to Leaflet**
Sun Mar 25. 1:00PM – 5:00PM.

DSI 410 **Data, Decisions and Prediction : A Primer for Social Justice**
Sat Apr 14. 10:00AM – 5:00PM., Sun Apr 15 . 1:00PM –5:00PM

DSI 511 **Theories of Change**
Sun Apr 22. 10:00AM – 5:00PM.

DSI 320 **Intro to D3**
Sun Apr 29. 1:00PM – 5:00PM.

Imagined Realities: Designing Spatial experiences

CTE 400 **Interactive and Immersive Installations**
Thu Fri. Jan 11 –12. 10:00AM – 5:00PM

TECH 460 **Building and Demolishing Walls in Blender and Nuke**
Tue Thu Jan 16, 18, 23, 25. 6:00PM – 9:00PM

CTE 360 **Creating for Mixed reality**
Wed Jan 17 – May 09. 3:00PM – 5:45PM

CTE 300 **Augmenting the World with Light: Projection Mapping**
Wed Jan 17. 6:00PM – 9:00PM

CTE 392 **Projection Hack: Immersive collaborative Light Collage**
Fri Jan 19. 6:00PM – 9:00PM

CC 300 **Recreating Sol Lewitt in a Digital Era**
Tue Jan 30. Thu Feb 15. Tue Feb 27. Thu Mar 13. 6:30PM – 8:30PM

CTE440 **The Walls Have Eyes: Live Video as a Control Signal**
Sun Feb 11. 10:00 AM – 5:00PM

CC 260 **An Introduction to Unity3D**
Sat Sun Feb 17 – 18. 10:00AM – 5:00PM

CTE461 **Realtime Skeleton Animation with Unity**
Sun Feb 25. 1:00 – 5:00PM

TECH 530 **Disappearing Acts**
Thu Mar 1, 8, 15, 22. 6:00PM – 9:00PM

CTE 430 **Interaction in a Spatial Context I: Fundamentals**
Sat Sun Mar 3 – 4. 10:00AM – 5:00PM

CTE 530 **Interaction in a Spatial Context II: Beginning Design**
Sat Sun May 5 – May 6. 10:00AM – 5:00PM

Engaged Senses: Video and Sound

CTE 400 **Interactive and Immersive Installations**
Thu Fri. Jan 11 –12. 10:00AM – 5:00PM

CTE 393 **Building Digital Instruments I: Intro to Sound Control**
Sat, Sun Jan 13 – 14. 10:00AM – 5:00PM

TECH 290 **An In-depth Introduction to Synthesis**
Wed Feb 21, 28. 6:00PM – 9:00PM

CTE 393 **Video as performance: Live Cinema and VJing**
Tue Mar 6. 6:00PM – 9:00PM

TECH 390 **An Introduction to MIDI**
Wed Mar 14. 6:00PM – 9:00PM

CTE 493 **Video as performance: Deeper Explorations**
Tue Mar 20. 6:00PM – 9:00PM

CTE 493 **Building Digital Instruments II: Raspberry Pi Instrument Design**
Tue Wed. Mar 27 – 28. 10:00AM – 5:00PM

CC 361 **Prototyping and Experimenting with VVVV**
Sat Apr 28. 10:00AM – 5:00PM

Exploring Agency: Interactive Experiences/Objects

CTE 360 **Creating for Mixed reality**
Wed Jan 17 – May 09. 3:00PM – 5:45PM

CTE 430 **Interaction in a Spatial Context I: Fundamentals**
Sat Sun Mar 3 – 4. 10:00AM – 5:00PM

CTE 393 **Video as performance: Live Cinema and VJing**
Tue Mar 6. 6:00PM – 9:00PM

CTE 493 **Video as performance: Deeper Explorations**
Tue Mar 20. 6:00PM – 9:00PM

CC 301 **Processing Projects: Dances with Robots**
Sat Mar 31. 10:00AM – 5:00PM

CC 361 **Making Machines Talk I**
Wed Apr 4. 6:00PM – 9:00PM

FAB 571 **Build Your Own Portable Book Scanner**
Sat Sun Apr 7 – 8. 10:00AM – 5:00PM

CC 361 **An Introduction to WebGL with THREE.js**
Tue, Thu Apr 10, 12. 6:00PM – 9:00PM

CC 361 **Making Machines Talk II**
Wed Apr 11. 6:00PM – 9:00PM

CC 361 **Prototyping and Experimenting with VVVV**
Sat Apr 28. 10:00AM – 5:00PM

CTE 530 **Interaction in a Spatial Context II: Beginning Design**
Sat Sun May 5 – May 6. 10:00AM – 5:00PM

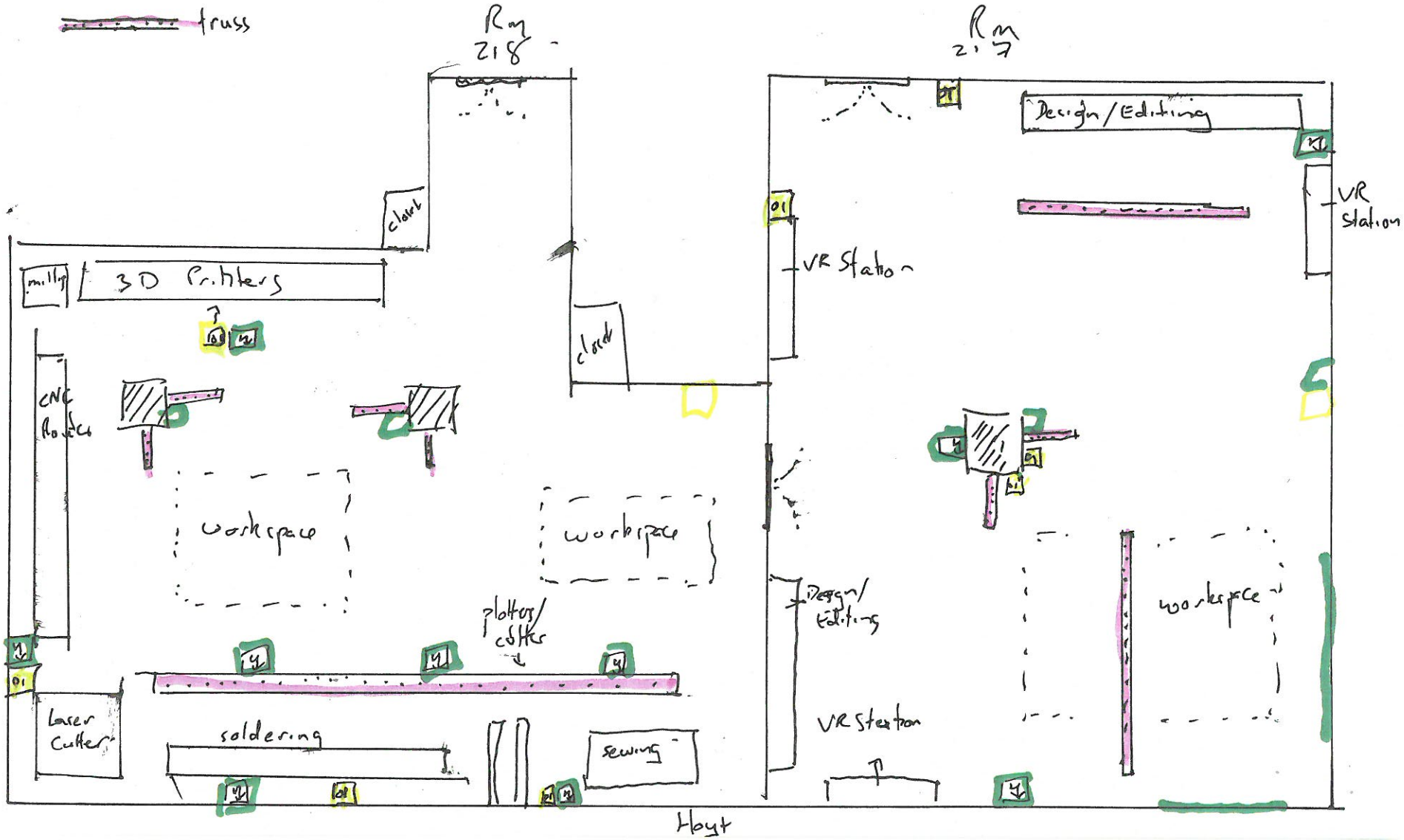
Not to Scale

Make + Think + Code Lab

01 - network port - add

- electrical outlet - add

truss



Grant Agreement -- Attachment 2

EXAMPLE OF INTERIM REPORT INFORMATION

ACTIVITES AND PROGRESS

Describe project activities that focus on the intended outcomes and/or progress made toward the outcomes. Provide both quantitative and qualitative details as they relate to an activity.

VIDEO OUTPUT

If the grant intends to produce video programming for the community media channels, describe the programming produced.

EVALUATION AND LEARNINGS

Summarize the key evaluation steps completed or underway. What are the primary lessons learned thus far about the project? Have you had any course corrections or adjustments to your project based on learnings thus far? How might these learnings impact project implementation in the next Reporting Period?

IMPLEMENTATION SUCCESSES AND CHALLENGES

By using the project's original implementation plan/timeline (included in Attachment 2 to the Grant Agreement, The Implementation Plan), provide a mark-up of the plan indicating the status of your project in relation to the original plan/timeline by adding a "status" column to your activities list.

Describe any anticipated and unanticipated successes and challenges.

EXPENSE DETAIL

Provide a line item accounting, in context of the original grant budget, of the expenditures incurred during the Reporting Period; including both Grant fund and Matching fund expenditures.

Provide a clear narrative of the expenditures incurred for each line item identified above.

Provide a clear explanation of any expenditure that substantially differs from the original Grant budget.

WORK SAMPLES

Periodically, the MHCRC will use photos and videos (with permission) on our website to highlight the work of the organizations we support. Please send us photos or videos that illustrate the impact of the grant project in the community. (By sharing photos or videos, you acknowledge that any and all material you are providing has been obtained with appropriate signed media releases and may be shared with the MHCRC's stakeholders and broader audiences.)

EXAMPLE OF FINAL REPORT INFORMATION

RESULTS

Describe the significant project activities that took place throughout the life of your project and how these activities contributed to the realization of the original project purpose and outcomes. (As applicable, please quantify your results as they related to your original project outcomes, i.e. numbers of people served, the demographics of those served, the number and type of content created, the number/type of classes/programs offered, etc.)

Outline your evaluation process, including evaluation tools and methods. Detail the results of your evaluation.

Do you have a testimonial story to tell that captures the essence of the project's impact? (Where anonymity is required, please use pseudonyms.)

REFLECTIONS

What did you learn about the problem or issue you were trying to address?
What did you learn about the population served?
What factors contributed to your success?
What, if any, were the significant challenges encountered? How did you address both anticipated and unanticipated challenges in the course of the project?

SUSTAINABILITY

Will the project/program continue beyond the term of this Grant? If so, what are your next steps and plans for continuing or changing the project/program?

EXPENDITURE DETAIL

Provide a line item accounting, in context of the original grant budget, of the expenditures incurred during the Project term; including both Grant fund and Matching fund expenditures.

Provide a clear narrative of the expenditures incurred for each line item identified in Step 1.

Provide a clear explanation of any expenditure that substantially differs from the original Grant budget.

WORK SAMPLES

Periodically, the MHCRC will use photos and videos (with permission) on our website to highlight the work of the organizations we support. Please send us photos or videos that illustrate the impact of the grant project in the community. (By sharing photos or videos, you acknowledge that any and all material you are providing has been obtained with appropriate signed media releases and may be shared with the MHCRC's stakeholders and broader audiences.)