

ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE

MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Exhibit Catalog



FIFE PERFORMANCE HALL	1
Creative Technologies in Music at the Nexus of Arts, Science, and Entrepreneurship	2
Sense of Place: User Experience and Interaction in Virtual and Augmented Reality	4
CUBE.....	6
Visualizing World War I through mixed reality	7
Immersive Space Arcade	9
A Blue Ribbon (Trailer) - Cinema for Immersive Media	10
The Right of Way	11
Volume of a Cube	12
EXPERIENCE STUDIO	13
Robotic Arm 3D Printing	14
PERFORM STUDIO.....	15
"Come Here" – A Bare Hand Gesture-Based Interface for Virtual Reality	16
How realistic are "natural" locomotion techniques in virtual reality?	17
Annotating Objects in Augmented Reality	18
Krinkle VR - A Virtual Reality Game with Natural Hand Interaction	19
Changes in architecture...changes in sound?	20
PORTICO (OUTSIDE)	21
Virginia Tech Campus: Augmented	22
GRAND LOBBY	23
Eagle Electrix: STEM Guitar Building Rocks!	24
Custom Laser Cutter Designs	25
Spotting the Danger in the Volcano Data	26
Subatomic Particle Physics in Virtual Reality	27
Virtual Reality Walkthrough of a 3D Printed Tissue Scaffold	28
Musical Robots	29
Modular Piano Design Team	30
Measuring Brain Activation During Design and Problem Solving	31
Transdisciplinary Choreographic Projects from TA 2984 Choreography	32
CHEM+C: An integrated approach to teaching computational thinking and science	33
Mixed Library - Bridging Real and Virtual Libraries	34
NASA Johnson Space Center student projects	35
Making Sense of Place	36
Responsive Surface // BarkLight	37
New Musical Interfaces	38
New Music Blacksburg	39

GRAND STAIRCASE	40
Technology on the Trail: Cultural Probes	41
FitAware: Leveraging Mobile and Wearable Technology toward Improved Health and Fitness	42
This is Your Brain on Nature	43
"Would you rather..." – Probing Tradeoffs with Technology in Hiking and Outdoors Settings	44
Collaborative Surface System for Exploring Hiking Blog Data	45
Learning about Trails: Approaches in Pathfinding, Visualization, and Linguistic Analysis	46
Hiking the Appalachian Trail with Technology	47
FRANCIS T. ECK EXHIBITION CORRIDOR.....	48
Open (at the) Source: Sensing Place	49
nui	50
Collaborative Healing	51
MERRYMAN FAMILY LEARNING STUDIOS.....	52
The Middle Experience	53
D.O.O.M.	54
Shattered Lenses	55
Light Wall	56
Neutral Focus	57
Pensieve	58
C-OLIVE: Playing and learning together inside a steam-powered olive oil production factory	59
Mirror Worlds	60
Elementary	61
MEZZANINE LOBBY	62
VTArtWorks	63
Personalized Paths	64
Civil War Photo Sleuth	65
GroundTruth: Supporting Open Source Investigative Journalism with Crowdsourcing	66
Incite: Connecting Historical Documents to Scholarly Topics via Crowdsourcing	67
Connect the Dots: Supporting Intelligence Analysis with Crowdsourcing and Visualization	68
Design for America	69
smART field	70
Analog Geo	72
BALCONY LOBBY	73
Project Calidus: Automated Child Car Cooling Device	74
SmartPurse	75
The Novis sedis Bike Camper	76
Safe Glove	77

The Mini-Beethoven: A Music Tutor for the Visually Impaired	78
The Heads Up Helmet	79
Project Iris	80
Movable Home	81
Augmented Reality Sandbox	82
Hologram Conference Display	83
Eye-Robot: Navigational Aid for the Visually Impaired	84
VisiBoom: A system for providing auditory awareness in an isolated environment	85
The Engineering of an Automated Task Completing Robot	86
CREDITS	87

Foreword

Welcome! The ICAT Creativity and Innovation Day is a celebration of the amazing Virginia Tech faculty and students working at the nexus of science, engineering, arts, and design. Panel discussions, performances, experiences, and expo-style exhibits will introduce you to cutting edge technology and research associated with Sensing Place.

Learn more about the research happening at the Institute for Creativity, Arts, and Technology (ICAT) and explore how science, engineering, arts, and design coalesce to form a sense of place, including the environmental place, the historic place, the virtual place, and the cultural place. Situate yourself at the Moss Arts Center to see how human senses and electronic sensors contribute to and learn from place. Meet the faculty and students who are crossing traditional boundaries to develop new possibilities for exploration, expression, and creativity.

It is my sincere hope that you learn from what you see, make connections with other people, and dream bigger than you did before.

Ben Knapp
Founding Director
Institute for Creativity, Arts, and Technology
Virginia Tech



Fife Performance Hall

Creative Technologies in Music at the Nexus of Arts,
Science, and Entrepreneurship

10:00 AM

Sense of Place: User Experience and Interaction in
Virtual and Augmented Reality

2:00 PM



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Creative Technologies in Music at the Nexus of Arts, Science, and Entrepreneurship

Anne and Ellen Fife Theatre

Panel discussion

10:00 AM

Technological advances in music have transformed the landscape of the contemporary arts and research alike. These developments have enabled new creative domains that do not fit in traditional disciplines, and bring together many ways of understanding and making creative products. Max and Pure-Data are two popular visual programming languages for multimedia. These programs allow people to build, change, and study music in ways that were previously impossible. In this panel moderated by the music professor Dr. Ivica Ico Bukvic, an artist, a technologist, and an entrepreneur will share their perspectives on the past, present, and future of creative technologies in music and their essential role in pushing the limits of creativity, education, innovation, and entrepreneurship.

Miller Puckette, University of California San Diego

David Zicarelli, Cycling '74

Shia-uen Ding, Pianist



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Miller Puckette is known as the creator of the Max and Pure Data real-time computer music software environments, which are taught and used by electronic musicians and artists worldwide. Originally a mathematician, he won the Putnam mathematics competition in 1979 and received a PhD from Harvard University in 1986. He was a researcher at the MIT Media lab from its inception until 1986, then at IRCAM (Paris, France), and is now professor of music at the University of California, San Diego. He has been a visiting professor at Columbia University and at the Technical University of Berlin.

Puckette performs with the Convolution Brothers and in a duo with Juliana Snapper, and has performed in concert music by composers Rand Steiger, Philippe Manoury, and Pierre Boulez, in venues including the Ojai Music festival, the Pulitzer Arts Foundation, Centre Acantes, and Carnegie Hall. He has been awarded two honorary degrees and the SEAMUS prize.

For more than 25 years **David Zicarelli** has been engaged in the development of the Max programming environment originally created by Miller Puckette. He is the founder and CEO of Cycling '74, a company with an entirely distributed workforce devoted to research into interactive programming systems for music and media.

A native of Taiwan, pianist **Shiau-uen Ding** is an energetic performer of traditional and contemporary repertoire. She attended National Taiwan Normal University and University of Cincinnati, where she received her doctoral degree. She lives in New York City.

She has performed in France, Germany, Belgium, China, India, and throughout the US and Taiwan. Most recently, she premiered Christopher Bailey's Empty Theatre, a quasi-concerto for piano and orchestra, at SinusTon Festival in Germany; and performed Philippe Manoury's Pluton, for piano and computer, with Miller Puckette at Kochi-Muziris Biennale in India. She was called a "daredevil" by The New York Times for her performance at Bang on a Can Marathon and "a powerful force on the new music scene" by Array for her recital at Spark Festival in Minneapolis. She directed and co-founded NeXT Ens, the first chamber ensemble in the US performing solely electroacoustic music with national recognition. She has recorded for Capstone, Centaur, Innova, and New Focus.



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Sense of Place: User Experience and Interaction in Virtual and Augmented Reality

Anne and Ellen Fife Theatre

Panel discussion

2:00 PM

Virtual reality (VR), augmented reality (AR), and related technologies are currently all the rage in the tech world, and are seen by many as the next big paradigm shift in computing. The technology is becoming mature, and many of the hard technical problems are well on their way to being solved. But some of the big problems in VR and AR are non-technical in nature. In particular, user experience and interaction design issues, which depend more on an understanding of human psychology and behavior, are critically important. Research on these problems may well determine the success or failure of VR and AR. In this panel, moderated by Center for Human-Computer Interaction Director Doug Bowman, four industry experts on the cutting edge of user experience and interaction research for VR and AR will discuss their own work and speculate on how people will use and experience VR and AR in the years to come.

David Eisenmann, Google Spotlight Stories

Richard Marks, Sony Interactive Entertainment

Ivan Poupyrev, Google Advanced Technology and Projects

Andy Wilson, Microsoft Research

David Eisenmann is a Producer & Computer Graphics Supervisor with Google Spotlight Stories. This group of engineers and artists is focused on creating the future of Virtual Reality media & technology. Eisenmann is excited to develop this emerging art form of 'immersive VR shorts' while pushing the boundaries of art & technology. David produced both the theatrical and virtual reality editions of PEARL which received an Academy Award nomination. PEARL has won 3 Annie ASIFA Awards (Directing, Production Design, and Music), 2 Ciclope Awards, a Proto award, and a Golden Reel MPSE award. He is formerly from Pixar and CG Supervisor on award winning films Finding Nemo, Ratatouille, Toy Story 2 & 3, and Monsters University.

Dr. Richard Marks heads the PlayStation Magic Lab at Sony Interactive Entertainment. Magic Lab, which sits under the Research & Development group, was founded by Marks to push the boundaries of play by investigating how technology can be used to create



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

new entertainment experiences. Marks joined PlayStation in 1999 to investigate the use of live video input for gaming and develop new interactive user experiences. He helped create the EyeToy and PlayStation Eye cameras and the PlayStation Move controller. Most recently, Marks and his team at Magic Lab have been involved with PlayStation VR. Marks received a Bachelor of Science in Avionics from Massachusetts Institute of Technology and a doctorate in the field of underwater robotics from Stanford University.

Dr. Ivan Poupyrev is an award-winning scientist, inventor and designer working at the cutting edge of interaction design and technologies blending digital and physical realities. Ivan is currently a Director of Engineering and Technical Lead at Google's Advanced Technology and Projects (ATAP) group where he directs efforts focused on interaction technologies and design for future digital lifestyle. Ivan's research focuses on inventing new technologies and interaction paradigms that seamlessly blend digital and physical interactivity in devices, everyday objects, and living environments on a very large scale. His work was extensively presented at major research conference such as ACM CHI, SIGGRAPH, UIST, reported in international press such as Wired, New York Times, Forbes, Washington Post among others and was awarded Cannes Lions Grand Prix Award in 2016. Fast Company Magazine recognized Ivan as one of the World's 100 Most Creative People calling him "one of the best interaction designers in the world."

Dr. Andy Wilson is a principal researcher at Microsoft Research. His work is focused on applying sensing techniques to enable new styles of human-computer interaction. Today that means multi-touch and gesture-based interfaces, display technologies, depth cameras and so-called "natural" interfaces. In 2002 he helped found the Surface Computing group at Microsoft. He manages the Natural Interaction Research group at Microsoft Research. Before joining Microsoft, he obtained his BA at Cornell University, and MS and PhD at the MIT Media Laboratory.



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Cube

DISIS 10th Anniversary Kickoff Concert with Shiau-uen Ding, Miller Puckette, and Linux Laptop Orchestra	Sunday, April 30 3:00 PM
Visualizing World War I through mixed reality: The mystery of the destroyed village of Vauquois and the War of the Mines	Monday, May 1 11:00 AM – 1:45 PM
Immersive Space Arcade	2:15 PM – 3:00 PM
A Blue Ribbon (Trailer) - Cinema for Immersive Media	3:05 PM – 3:20 PM
The Right of Way	3:40 PM – 4:00 PM
Digital Interactive Sound and Intermedia Studio (DISIS) Anniversary Concert with Virginia Tech Percussion Ensemble's <i>Volume of a Cube</i> and other works	7:30 PM



Visualizing World War I through mixed reality: The mystery of the destroyed village of Vauquois and the War of the Mines

Cube

11:00 AM-1:45 PM

This exhibit showcases a mixed-reality environment, built by a team from Virginia Tech and French partners from the Vauquois Hill Association and rescue archeologists at Arkemine, to explore what happened to a small sleepy French village on the Butte de Vauquois during World War I.

Participants will experience 360 degree video in the Cyclorama, coupled with projection mapped animations on a large diorama, in the Cube. Following the Cyclorama experience, the audience will be offered an opportunity to experience what it was like to live in the mines of Vauquois through virtual reality.

Process: Our team of technologists, artists, educators, historians, engineers, and archaeologists performed a comprehensive site survey of the Hill of Vauquois, combining ground penetrating radar, photogrammetry, and laser scanning to create a digital recreation of the above and below ground features of the craters, trenches, tunnels and galleries that allows us to see Vauquois as it has never been seen before. 360 degree video, animation, and virtual reality tell the story in an immersive experience.

ICAT-funded project, ICAT-affiliated faculty project

Todd Ogle, Technology-Enhanced Learning and Online Strategies (TLOS)

Thomas Tucker, School of Visual Arts

David Hicks, School of Education

DongSoo Choi, School of Visual Arts

David Cline, History

Erik Westman, Mining and Minerals Engineering

Celine Beauchamp, Arkemine

Adrien Arles, Arkemine

Doug Bowman, Computer Science



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Students

Daniel Newcomb
Maureen Sues
Huy Ngo
Phat Nguyen
Zach Bush
Matthew Yourshaw
Alex Forlini
Brennan Young
Nick Wyers
Run Yu

Faculty

Tanner Upthegrove
Zach Duer

Institute for Creativity, Arts, and Technology, College of Architecture and Urban
Studies, College of Engineering, College of Liberal Arts and Human Sciences



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Immersive Space Arcade

Cube

2:15 PM-3:00 PM

This immersive game utilizes the three major components of the Cube: spatial sound system, the motion capture system, and the cyclorama. Also, players can experience the sounds following asteroids flying, displaying an immersive outer space where one can destroy asteroids by aiming at them with a wand.

The audience will experience an immersive and interactive activity where they are surrounded by floating asteroids in space. With a controller stick provided by the team, each person can experience what it would be like to shoot asteroids. The project is a game that people of all ages can enjoy!

Process: Unity and Max were used to create the backend system of the project. The movement and user interaction were done in Unity, and the sound system was done in Max. Using the Qualysis motion capture system, user interaction data was sent to Unity, which used the Cyclorama to project the graphics. Sound was played through the spatial sound system in the Cube with the coordinate and volume data sent from Max.

ICAT course project

Jooyoung Whang, Virginia Tech undergraduate, Honors College

Eliza Hong, Virginia Tech undergraduate, Honors College

Thaw Zin, Virginia Tech undergraduate, Honors College



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

A Blue Ribbon (Trailer) - Cinema for Immersive Media

Cube

3:05 PM-3:20 PM

The trailer for A Blue Ribbon will be shown in 360 3D cinema. This is the trailer for a documentary on the iconic Blue Ridge Parkway and serves as the proof of concept for a thesis in the Creative Technologies Master of Fine Arts. The documentary will be presented in using the emerging field 360 3D cinema.

Audience members will be able to walk around the cyclorama and experience an immersive visual and audio experience. They will get a sampling of the possibilities of immersive cinema in the context of the Blue Ridge Parkway and Appalachia

Process: We use a 6-camera array to capture images in 360 degrees. Using a special software we combine the images into two separate spherical images. The projector then projects each image one after the other at 1/120th of a second matching the shuttering of the 3D glasses; this is called Active 3D. Creating immersive media offers many opportunities beyond that of tradition cinema. One of the most interesting aspects is the audience must view the piece multiple times for the full experience.

ICAT-funded project, ICAT-affiliated student project

George Hardebeck, School of Visual Arts, ICAT
Ryan Vazquez, Music



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

The Right of Way

Cube

3:40 PM-4:00 PM

The Right of Way is a new documentary play that asks who really has claim to city streets - and how those ideas may be changing. Actors and spatial audio trace the true story of a fallen bicyclist through interviews with transportation engineers, urban planners, lawyers, and bicycling activists.

Audiences will witness the performance of a 20-minute excerpt of The Right of Way featuring live actors, spatial audio, and projected video. Audiences will surround a central playing space in the heart of the Cube.

Process: The Right of Way began through extensive interviewing of sources by playwright Thomas Murray. In addition to talking with family and friends of the fallen cyclist, Murray spoke with civil engineers, urban planners, lawyers, automobile historians, educators, and bicycle activists. Their verbatim text was adapted into a draft script for workshop performance. At the point of initial playwriting, spatial audio engineer Tanner Upthegrove began composing original tracks to augment the immersive storytelling.

ICAT-funded project

Thomas Murray, Theatre Arts
Tanner Upthegrove, ICAT, Theatre Arts



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Volume of a Cube

Cube

7:30 PM

The VT Percussion Ensemble, under the direction of Annie Stevens, will present a performance of their 2017 commissioned piece, "Volume of a Cube for 18 percussionists" by Drew Worden. This was specifically composed for the Cube and utilizes spatial audio concepts.

The audience will be immersed in percussive sounds that explore spatial audio concepts through amplification and the placement of players. Performers are staggered from the ground floor, through the first two balconies, and set-ups are amplified creating an engulfing musical experience for the audience. Each movement explores concepts of volume, weight, height, and depth through the use of placement of sound throughout the Cube.

Process: Drew Worden, the composer of this work, was informed of the spatial audio capabilities of the Cube. We discussed how players could be placed in specific locations and having each player amplified to further enhance the concept of this piece. Tanner Upthegrove further enhanced this work through various reverb effects. Sight limitations in the Cube required the performances to wear click tracks for the performance. A world premiere performance was presented in the Cube on February 28, 2017.

ICAT-funded project

Annie Stevens, School of Performing Arts, Music
Tanner Upthegrove, ICAT

Experience Studio

Robotic Arm 3D Printing

11:00 AM – 4:00 PM



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Robotic Arm 3D Printing

Experience

11:00 AM-4:00 PM

3D printing, since its creation, has been able to fabricate impossible structures. This platform, based on a robotic arm, pushes the boundaries of 3D printing by allowing material to be deposited at any angle. This freedom produces stronger and lighter parts optimized for their application.

The audience will be able to watch the robot as it prints huge parts! A hands-on display will let people be able to interact with large and small printed parts with an informational video about 3D printing and this large-scale machine.

Process: As their senior capstone project, a team of seven mechanical engineers designed and completed the system. For this demonstration, an STL file is imported into Slic3r (or any standard 3D printing slicing software) to generate GCode. This GCode contains XYZ positioning information but is insufficient to fully define the robot's position. A custom MATLAB script processes the GCode and attaches the missing rotational information. This new file can then be supplied to the robot for printing.

ICAT-funded project, ICAT-affiliated faculty project

Joseph Kubalak, Mechanical Engineering
Christopher Williams, Mechanical Engineering, ICAT

Perform Studio

"Come Here" – A Bare Hand Gesture-Based Interface for Selection and Manipulation in Virtual Reality

11:00 AM – 2:00 PM

How realistic are "natural" locomotion techniques in virtual reality?

Annotating Objects in Augmented Reality

Krinkle VR - A Virtual Reality Game with Natural Hand Interaction

Changes in architecture. . . . changes in sound?

2:30 PM – 4:00 PM



“Come Here” – A Bare Hand Gesture-Based Interface for Selection and Manipulation in Virtual Reality

Perform

11:00 AM-2:00 PM

We present a creative approach for bare-hand 3D selection and manipulation in virtual reality. The goal is to overcome limitations of a naive “grab and move” method, which is prone to the sensor’s noise and appears to break the rules of physics, while providing an experience that is powerful and fun with adequate precision

The user will be placed in a 3D virtual environment by wearing a motion tracked head-mounted display. Objects in the virtual scene can then be controlled (rotated or translated) with natural hand gestures.

Process: There were mainly three iterative steps to build such a virtual reality interface.

1. Brainstorm and interface design: Driven by a task in virtual reality (in this case, 3D selection and manipulation), we discussed potential ideas for interaction design along with literature review. We also considered limitations of available hardware/software in order to validate the implementation of our novel interface.
2. Prototyping: We developed algorithms to extract features from the user’s hand poses and motions for gesture recognition and applied physics based movement to selected objects in the virtual scene.
3. Refinement: Based on the experience with the prototype, we iteratively improved the design and implementation.

ICAT-affiliated faculty project

Run Yu, Center for Human-Computer Interaction, Computer Science

Doug Bowman, Center for Human-Computer Interaction, Computer Science



How realistic are “natural” locomotion techniques in virtual reality?

Perform

11:00 AM-2:00 PM

The Virtuix Omni is a commercial device which allows infinite physical walking in a virtual reality (VR) environment. But how much does it feel like real walking, and how does it compare to less “natural” movement techniques in VR? Come test it out for yourself!

Visitors will first get “suited up” to use the device: they will wear a special pair of shoes, stand on a slick platform, and strap into the harness system that supports most of their weight. They will then be fitted with a head-worn VR display. At this point, they will be able to “walk” in the device to explore a virtual environment. We will also demonstrate some specific walking tasks they can try that focus on speed, precision, or spatial orientation.

Process: The Virtuix Omni is a commercial device which allows a user to be held in place while using natural walking motions and wearing a head-worn display (HWD). Our group has developed a virtual environment containing multiple locomotion tasks utilizing the Unity Game Engine (previously used in the Cube). We adjusted the software so that the tasks were able to be executed using the Omni interface to see how this realistic walking interface would perform in VR.

ICAT-affiliated faculty project, ICAT-affiliated student project

Doug Bowman, Center for Human-Computer Interaction/Computer Science
Mahdi Nabiyouni, Center for Human-Computer Interaction/Computer Science
Lawrence Warren, Center for Human-Computer Interaction/Computer Science



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Annotating Objects in Augmented Reality

Perform

11:00 AM-2:00 PM

How well can you estimate distances? In this project, we investigate if techniques based on human depth perception are useful to annotate objects in augmented reality. This approach can be used to annotate objects when triangulation and other scanning techniques fail.

The audience will have the opportunity to use an augmented reality device to estimate distances to objects.

Process: We implemented a technique in which the user can adjust the distance to a target using the Xbox controller. The result can be compared to a triangulation technique, where the user defines rays from two different viewpoints. Both techniques run on Microsoft HoloLens, but can also be simulated inside a virtual reality scene.

ICAT-affiliated faculty project

Wallace Lages, Center for Human-Computer Interaction, Computer Science
Doug Bowman, Center for Human-Computer Interaction, Computer Science

Institute for Creativity, Arts, and Technology, College of Engineering



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Krinkle VR - A Virtual Reality Game with Natural Hand Interaction

Perform Studio

11:00 AM-2:00 PM

Krinkle VR is virtual reality (VR) game in which you control four classic elements: air, water, fire, and earth. Your mission is to defend a castle against hungry creatures called Krinkles, before they eat it all! Raise earth blocks, create water blobs, and cast fire to prevent the invasion!

The audience will have the opportunity experience a virtual reality game with hand tracking technology.

Process: We designed 3D interaction techniques to replace the game's original control. The new techniques are based on hand gestures, which are tracked using a Fingo sensor. The game was built using Unity3D and runs on HTC Vive. Besides fire, now players can control earth, water, and wind. Earth blocks can be raised from the ground and pushed around. Water uses deformable blobs and can be used to freeze opponents. Wind is used for player locomotion around the scenario and is rendered using particles.

ICAT-funded project, ICAT-affiliated faculty project

Wallace Lages, Center for Human-Computer Interaction, Computer Science

Run Yu, Center for Human-Computer Interaction, Computer Science

Leonardo Arantes, Illus Interactive Graphics

Mahdi Nabiyouni, Center for Human-Computer Interaction, Computer Science

Doug Bowman, Center for Human-Computer Interaction, Computer Science

Institute for Creativity, Arts, and Technology, College of Engineering



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Changes in architecture...changes in sound?

Perform Studio

2:30 PM-4:00 PM

Concert hall sound fields were simulated by architecture students, and anechoic recordings were convolved to create auralizations in those simulated performance spaces. Then an architectural feature was altered digitally and a second track was auralized.

Come listen and see if you can hear the difference when a suspended reflector is added to a concert hall, or a balcony is removed.

Process: College music students were recruited, tested for hearing loss, and brought to a low-reverberance room with a spatial sound array of 28 mounted speakers (the Perform Lab). They were asked to identify which of the two simulated tracks they prefer. We compared simulated performance spaces.

ICAT-affiliated faculty project

Michael Ermann, Architecture
Tanner Upthegrove, ICAT
Drew Hulva, Architecture

Institute for Creativity, Arts, and Technology, College of Architecture and Urban Studies

Portico (outside)

Virginia Tech Campus: Augmented

11:00 AM – 4:00 PM



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Virginia Tech Campus: Augmented

Portico

11:00 AM-4:00 PM

Virginia Tech Campus: Augmented is a free app built by Todd Ogle and David Hicks that allows users to identify campus buildings/landmarks, gain familiarity and confidence with Virginia Tech surroundings, and become an expert navigator of campus, all through augmented reality.

The audience will be able to experience Virginia Tech Campus: Augmented on provided iPads just outside the Moss Arts Center and have the opportunity to install it on their own devices if desired.

Process: We built a database of campus buildings from public data, that is served through a an off-the-shelf augmented reality application. The data were recently updated by students in a digital humanities course in Fall 2016 as part of a project on creating place-based learning experiences for history and social studies education.

ICAT-affiliated faculty project

Todd Ogle, Technology-Enhanced Learning and Online Strategies (TLOS), ICAT
David Hicks, School of Education

Institute for Creativity, Arts, and Technology, College of Liberal Arts and Human Sciences

Grand Lobby

Eagle Electrix: STEM Guitar Building Rocks!

11:00 AM – 4:00 PM

Custom Laser Cutter Designs

Spotting the Danger in the Volcano Data

Subatomic Particle Physics in Virtual Reality

VR of a 3D Printed Tissue Scaffold

Musical Robots

Modular Piano Design Team

Measuring Brain Activation

Transdisciplinary Choreographic Projects

CHEM+C

Mixed Library

NASA Johnson Space Center student projects

Making Sense of Place

Responsive Surface // BarkLight

New Musical Interfaces

New Music Blacksburg

5:45 PM – 7:15 PM



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Eagle Electrix: STEM Guitar Building Rocks!

Grand Lobby

11:00 AM-4:00 PM

Eagle Electrix is a STEM guitar building experience at Auburn High School in Montgomery County Public Schools, Virginia, spanning entrepreneurship, carpentry, electronics, to the School of Rock. Students combined skills to brand a company, build and sell electric guitars, and learn about music.

Students will showcase and play electric guitars built in class.

Process: Three high school classes, Entrepreneurship, Materials and Processes, and School of Rock, combined and worked together to form a company, brand, and logo; build electric guitars while learning about woodworking, painting and finishes, electronics; and finally tuning and playing their guitars.

ICAT-funded project, ICAT-affiliated faculty project, ICAT education partner project

Jamie Simmons, Montgomery County Public Schools, ICAT

Simone Paterson, School of Visual Arts

Benjamin Kratz, Montgomery County Public Schools

Bob Priest, Montgomery County Public Schools

Custom Laser Cutter Designs

Grand Lobby

11:00 AM-4:00 PM

Come to learn more about 3D-printing and laser-cutting, see 3D-printers and laser-cutters live in action, and take home a souvenir that is customized for you.

Ask questions about 3D-printing and laser-cutting, choose what to write on your souvenir, watch it getting cut and etched in the laser-cutter, and take home your customized souvenir.

Process: Before the event, we use the graphics program Corel Draw to draw the design and prepare the parts of the souvenirs that are the same for everyone. During the event, we only add the participant's name at the right place and etch it on the souvenir.

ICAT-funded project

Rabih Younes, Electrical and Computer Engineering, ICAT



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Spotting the Danger in the Volcano Data

Grand Lobby

11:00 AM-4:00 PM

The Geodesy and Tectonophysics Lab in the Dept. of Geosciences is challenging its audience to help identify surface motion signals using time-series volcano data. We aim to teach how we go to the field, set up GPS instruments to collect measurements of the surface, and determine info about a volcano.

The audience will be able to watch and learn about what it is like to do fieldwork and collect data in exotic places of the world. Each student from our lab will explain how we set up the equipment and collect data, then explain the real-time data displayed on the screen and how it is used to measure volcanoes. Later, each audience member will be given the opportunity to identify significant signals on a worksheet using the information learned from the mini-presentation and have the chance to win a 3D-printed mini volcano.

Process: We travel around the world to places such as Tanzania and Madagascar to set up GPS instruments and measure surface motions. The data presented during ICAT Day will be from two GPS stations we set up in Tanzania around an active volcano to study volcano hazards. Data will be displayed using modern cyberinfrastructure. We will also share photos of the places we visit and work we do. This project involves geosciences, data science, and technological disciplines.

D. Sarah Stamps, Assistant Professor, Department of Geosciences

Tahiry Rajaonarison, PhD Graduate Student, Department of Geosciences

Josh Jones, MSC Graduate Student, Department of Geosciences

Jessi Pentecost, MSC Graduate Student, Department of Geosciences

Codi Wiersma, Undergraduate Researcher, Department of Geosciences

Lidia Guerra, Laboratory Assistant, Department of Geosciences



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Subatomic Particle Physics in Virtual Reality

Grand Lobby

11:00 AM-4:00 PM

Explore subatomic particle physics with VR headsets! This virtual reality model of the Belle II experiment shows the marvels of the subatomic world, where matter and antimatter collide at almost the speed of light, converting energy to matter and back again in less than a nanosecond.

There will be two Oculus Rift headsets for users to wear. They will stand in front of our station and be able to explore and control the simulation using an Xbox controller. Audience members will see a poster with images from the simulation and the Belle II experiment along with supporting text descriptions and examples of the lesson plans that accompany this project when it is used for classes of physics students in the Cube.

Process: Beginning as a ICAT Major SEAD (science, engineering, arts, and design) grant with collaboration between physics, education, computer science, creative technologies, and TLOS, students from those disciplines have played key roles. To visualize a particle data set, they learned how to parse and translate data into the 3D space of the Unity game engine which drives the simulation. They then created lesson plans to accompany the simulation, so it can be used to help physics students learn the principles of subatomic particle physics.

ICAT-funded project

Leo Piilonen, Physics

George Glasson, Education

Zach Duer, ICAT

Tanner Upthegrove, ICAT

Jesse Barber, Physics

Samantha Spytek, Physics, PhysTEC

Christopher Dobson, Physics, PhysTEC

Kari Zacharias, Science and Technology in Society

Todd Ogle, Technology-Enhanced Learning and Online Strategies (TLOS)

Dane Webster, Creative Technologies

Nicholas Polys, Computer Science, npolys@vt.edu



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Virtual Reality Walkthrough of a 3D Printed Tissue Scaffold

Grand Lobby

11:00 AM-4:00 PM

Ensuring 3D printed part quality is hard, as printed parts do not perfectly match the design. Virtual reality provides an interactive way to assess print quality. Colors on the surface of a virtual 3D printed tissue scaffold show how close that region is to design. The closer to green the better!

Participants will be able to put on an Oculus Rift headset and walk around the virtual tissue scaffold.

Process: The tissue scaffold was designed in CAD and printed. A virtual model of the printed part was generated using CT scanning, ImageJ, and Geomagic Design to scan the part, reconstruct a virtual model, and clean up the model. Using MeshForge, the virtual model and designed CAD model were compared, creating surface mapped deviation data and the colors users see on the surface of the virtual model. This color mapped model was imported into Unity and displayed in the Cube.

ICAT-affiliated faculty project

Joseph Kubalak, Mechanical Engineering
Nicholas Chartrain, Materials Science and Engineering
Christopher Williams, Mechanical Engineering

Musical Robots

Grand Lobby

11:00 AM-4:00 PM

Our Musical Robots are little bizarre machines that produce sound physically and through speakers. They sense us with proximity, sound, and touch sensors and can act based on different interactive modes. Explore them!

Interactive playtime. Users will touch, speak and gesture to interact with small and safe machines. Such interaction will result in sound production.

Process: We use the Raspberry Pi micro-computer and the PD-L2Ork software to create an integrative platform for driving LEDs, motors, speakers, and solenoids to produce sound. We use our musical robots to host K-12 educational workshops that aim to teach programming skills to children aged 9-12.

ICAT-affiliated faculty project, ICAT-affiliated student project

Kyriakos Tsoukalas, Interdisciplinary Graduate Education Program/grad student,
ICAT/Graduate Research Assistant

Ivica Ico Bukvic, Music, ICAT/senior fellow

Lisa Moyer, School of Education/Postdoctoral Associate

Sami Morency, Computer Science/student

Institute for Creativity, Arts, and Technology, College of Engineering, College of Liberal Arts and Human Sciences



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Modular Piano Design Team

Grand Lobby

11:00 AM-4:00 PM

What if a grand piano could fit in your backpack? The Modular Piano is bringing the haptic experience of the grand piano in the form of the most portable electric grand ever.

The audience can play an octave of the piano.

Process: We've developed a multi-state piano that is optimized for playing and optimized for storage and travel. We also have designed a beautiful musical instrument, aimed towards users who appreciate quality in both an aesthetic and haptic experience. We will be displaying our prototype at this event.

ICAT-funded project, ICAT-affiliated student project

James Rotbert, Electrical and Computer Engineering

Celeste Greenbaum, Industrial Design

Chris Suchoski, Electrical and Computer Engineering

Harrison Pearson, Mechanical Engineering

Nathan Kent, Industrial Design

Keith Kreiner, Electrical and Computer Engineering

Charles Nichols, School of Performing Arts

Measuring Brain Activation During Design and Problem Solving

Grand Lobby

11:00 AM-4:00 PM

What does brainstorming, or idea generation, look like in the brain? Where does insight come from? Can the Aha! moment be measured? We begin to answer these questions and more using a neuro-imaging technique called functional near infrared spectroscopy.

Participants will wear cap on their head, called functional near infrared spectroscopy, while playing a game. The audience will see in real time the dynamic changes in cognitive activation of the participant as they work to solve design challenges in the game..

Process: We used functional near infrared spectroscopy to measure cognitive activation during design and problem solving tasks with freshmen and senior engineering students. Tasks were modeled after real world design problems in engineering. We found a significant difference: freshmen showed 20 times greater activation in the part of the brain related to abstract reasoning while seniors showed 35 times greater activation in the area associated with behavior control and error detection.

ICAT-funded project

Tripp Shealy, Civil and Environmental Engineering

Jake Grohs, Engineering Education

Robin Panneton, Psychology

Darren Maczka, Engineering Education

Mo Hu, Civil and Environmental Engineering

Xiao Yang, Psychology

Institute for Creativity, Arts, and Technology, College of Engineering, College of Science



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Transdisciplinary Choreographic Projects from TA 2984 Choreography

Grand Lobby

11:00 AM-4:00 PM

The six transdisciplinary choreography projects are an integration of dance, images, other clips, music/voice/sound, text, and editing effects to communicate an issue of concern. The messages are immediate and brief, ranging from 2.5 to 5 minutes

The student transdisciplinary projects will be shown in a video loop and the student choreographers will be at the booth to answer any questions and describe their processes for compiling their projects.

Process: Identify issue of concern. Choreograph dance or dance segments that express this concern. Gather images, clips, images, texts, music/voice/sound, etc that might strengthen the message. Videotape choreography from 5 camera angles. Analyze and select dance footage and edit in various ways. Draft storyboard indicating all the components. Compile project with an editing platform

Other:

ICAT-funded follow up project from Spring 2016

Annika Kapani, Business Information Technology, sophomore

Heather McShane, Human Nutrition, Foods & Exercise, senior

Devin Nash, Psychology, senior

Christy Bonner, Political Science, senior

Kathryn Schneider, Multimedia Journalism, junior

Jackie Liu, General Biosciences, sophomore

Serena Emanuel, Bio Systems Engineering, junior

Billie Lepczyk, School of Performing Arts - Theatre & Cinema, professor

Institute for Creativity, Arts, and Technology, Pamplin College of Business, College of Engineering, College of Liberal Arts and Human Sciences, College of Science

The banner features a blue background with a white graphic of a globe or network of lines on the left. The text on the right is white and reads: "ICAT CREATIVITY AND INNOVATION DAY", "SENSING PLACE" (in large, bold letters), and "MONDAY, MAY 1, 2017 MOSS ARTS CENTER".

ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

CHEM+C: An integrated approach to teaching computational thinking and science

Grand Lobby

11:00 AM-4:00 PM

CHEM+C uses computer simulations to model chemistry concepts both to deepen students' understanding of the science and also to introduce them to computational thinking. In classrooms, students learn from adjusting settings and running the simulations, and they also learn how to make program changes.

Visitors to our exhibit will have the opportunity to interact with the simulation interface on a Chromebook or laptop computer. We will also project the simulation on a screen so that passersby can watch it run. If desired, the project team members can offer explanations or descriptions of how the models were designed and/or incorporated into classroom teaching.

Process: Over the past year and a half, our project team has created three computer simulations in NetLogo that model chemistry concepts that are typically difficult for students to learn. These were used in middle school classrooms and refined through multiple iterations of student interventions. We have now designed a fourth and final simulation which models the industrial carbon cycle. The simulation was created using the NetLogo web application and works with a wifi connection.

ICAT-affiliated faculty project

Deborah Tatar, Computer Science, ICAT
Whitney Bortz, Computer Science, ICAT
Aakash Gautum, Computer Science, ICAT
Felicia Etzkorn, Chemistry

Institute for Creativity, Arts, and Technology, College of Engineering, College of Science



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Mixed Library - Bridging Real and Virtual Libraries

Grand Lobby

11:00 AM-4:00 PM

Mixed library is a pilot project that explores how to expand a physical library into a virtual space by creating a mixed-reality interface. The goal is to help access library services when in the physical library space and to provide a virtual library when outside the physical library space.

The audience will see a movie loop summarizing the project and try a demo app on tablets and Microsoft HoloLens device.

Process: We identified a set of basic functionalities (tasks, services, and activities) in real and virtual libraries. Then we studied the physical layout of the Virginia Tech Newman Library to identify several use cases and develop a user study. We used Unity to create a prototype user interface which was then deployed on Microsoft HoloLens devices. Then we explored how to interface with the selected services and provide access to them in a mixed-reality environment.

ICAT-funded project, ICAT-affiliated faculty project

Denis Gracanin, Computer Science
Mohamed Handosa, Computer Science
Reza Tasooji, Computer Science

Institute for Creativity, Arts, and Technology, College of Engineering

NASA Johnson Space Center student projects

Grand Lobby

11:00 AM-4:00 PM

These student projects were developed in collaboration with NASA Johnson Space Center. Students designed wearable technology and smart fabrics for space flight.

Who would have thought? Student projects aimed to solve problems such as wayfinding for astronauts on Mars, preventing callouses on the top of astronauts' feet on the International Space Station, and unstinking stinky exercise clothes so that you don't have to burn them up in the atmosphere as often.

Process: The students are working with NASA mentors to develop design concepts addressing their problems. Two classes are working on the projects together: Students from the Textiles Space class in Architecture+Design, and from the Wearable and Ubiquitous Computing class in Electrical and Computer Engineering. The team will travel to Johnson the week before ICAT Day to present their work at a poster session and meet with their NASA mentors.

ICAT-affiliated faculty project

Paola Zellner, School of Architecture+Design

Tom Martin, ICAT

Adam Burke, School of Architecture+Design

Megan Kelly

Marlon Levy-Faigen

Connor Collins

Surabhi Gujar

Austin Ledzian

Elizabeth Park

Sahil Dudani

Armaghan Behzad Behbahani

College of Architecture and Urban Studies, College of Engineering



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Making Sense of Place

Grand Lobby

11:00 AM-4:00 PM

Making Sense of Place invites participants to relate their own experiences and observations to the event theme of Sensing Place. Through small displays placed throughout the Moss Arts Center, this project encourages reflection on the spaces and places in which exhibitions and events take place.

Participants will view short prompts and pieces of information displayed throughout the building. They will be invited to reflect on and question their experiences of the physical space and the exhibitions. I hope to develop a way for participants to record their responses to the prompts as well.

Process: The project is based on ongoing ethnographic work that I've been conducting at ICAT since fall 2013, approximately the same time the Moss Arts Center opened. I have interviewed faculty, staff, students, and administrators, observed events like performances, classes, demos, and meetings, and analyzed documents from ICAT's past. This project translates some of my research findings and questions for a wider audience, and invites participants to respond.

ICAT-affiliated student project

Kari Zacharias, Science, Technology, and Society

College of Liberal Arts and Human Sciences



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Responsive Surface // BarkLight

Grand Lobby

11:00 AM-4:00 PM

BarkLight is an interactive surface that responds to proximity, movement, and curiosity. The flattened 96" x 42" poplar bark panel provokes interest due to its unusual presentation of a natural material. As another layer of surprise, embedded LEDs follow a person's hand around when it is engaged.

The audience will be taken by surprise at first when they realize the large panel is made of real tree bark. When they get closer to it, perhaps reaching their hand out to touch, they will find another element of surprise. Embedded green LEDs will glow and follow their hand around when waved in front of the panel. This exhibit will be interactive and memorable.

Matt Wagner, School of Architecture + Design
Arthur Ball, Electrical Engineering
Michael Dill, Electrical Engineering
Harley Curran, School of Architecture + Design
Habeeb Muhammad, School of Architecture + Design
Elaine DaSilva, School of Architecture + Design

New Musical Interfaces

Grand Lobby

11:00 AM-4:00 PM

New Musical Interfaces is a collection of three projects produced as part of the MUS4014H course by the three collaborative multidisciplinary teams. Deliverables can be either a playable instrument or a responsive environment. Come and experience the next generation musical interfaces first hand.

Audience will be able to interact with each new musical interface on an individual basis and will be able to inquire about the interface design, purpose, and behavior, and ultimately provide feedback to each team based on their own observations.

Students participating in the MUS4014H New Musical Interfaces were exposed to a broad array of topics, including ideation, iterative design, 3D printing, user interface design and computer programming, sound and digital signal processing, musical composition, interaction design, as well as customer discovery and ultimately presentation. Each musical interface is a result of a transdisciplinary journey that incorporates multiple disciplines into a single focal deliverable.

Galina Belolipetski
Brandon Hale
Ryan Jakiel
DJ Malinowski
Jessica Shen
Kyriakos Tsoukalas
Qichao Wang

New Music Blacksburg

Grand Lobby

5:45 PM-7:15 PM

A concert of new classical chamber music, composed by students in the Composition program at the School of Performing Arts, performed by student and faculty instrumentalists.

An informal concert in the Grand Hallway of the Moss Arts Center, of new classical chamber music.

Process: Students are composing pieces for brass trio and saxophone quartet this semester, and other pieces for solo instruments and small chamber groups.

ICAT-affiliated faculty project, ICAT-affiliated student project

Charles Nichols, Music, ICAT
Tommy Burns, soprano saxophone
Kyle Hutchins, alto saxophone
Thomas Grady, tenor saxophone
Jacob Meridian, baritone saxophone

Allison Harris, soprano
Erling Nygard, violin
Timothy Vales, viola
Christina Lin, cello
Katie Magnant, cello
Elena Porter, cello
Ben Epperly, piano
Joseph Hart, piano

performing pieces by

the Music Composition class and Galina Belolipetski, Brandon Hale, Alex McLean, and Michael Mills

The banner features a blue background with a white graphic of a globe or sphere composed of intersecting lines and dots on the left side. The text is in white, with 'SENSING PLACE' in a large, bold, sans-serif font. Below it, 'MONDAY, MAY 1, 2017 MOSS ARTS CENTER' is written in a smaller, all-caps, sans-serif font.

ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Grand Staircase

11:00 AM – 4:00 PM

Technology on the Trail: Cultural Probes

FitAware: Leveraging Mobile and Wearable Technology toward Improved Health and Fitness

This is Your Brain on Nature

"Would you rather..." – Probing Tradeoffs with Technology in Hiking and Outdoors Settings

Collaborative Surface System for Exploring Hiking Blog Data

Learning about Trails: Approaches in Pathfinding, Visualization, and Linguistic Analysis

Hiking the Appalachian Trail with Technology

Projects at the Grand Staircase are part of the Center for Human-Computer Interaction's Technology on the Trail research.



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Technology on the Trail: Cultural Probes

Grand Staircase

11:00 AM-4:00 PM

Technology on the Trail is an initiative exploring how technology does and doesn't work in the wild. We used cultural probes as a technique to get hikers to tell us how they feel about tech while hiking.

The audience will be able to handle a sample probe kit and participate in shorter versions of one or more individual probe activities.

Process: The probe kit contains six activities designed through an iterative process that attempt to engage the participants creatively. Members of Technology on the Trail attempted early versions of the activities to test viability. The design paid particular attention to the time commitment, to priming the participant, and to flexibility. Then the probe kit supplies were picked and assembled. All supplies necessary to complete the activities are included in the kit.

ICAT-funded project

Sarah Grace Fields, Computer Science, ICAT

Scott McCrickard, Computer Science, Center for Human-Computer Interaction

Steve Harrison, Computer Science, Center for Human-Computer Interaction

Julie Nguyen, Computer Science

Navyaram Kondur, Computer Science

College of Engineering

FitAware: Leveraging Mobile and Wearable Technology toward Improved Health and Fitness

Grand Staircase

11:00 AM-4:00 PM

FitAware, a technology-based extension of Virginia Tech's FitEx 8-week team fitness program, incorporates smartwatches and smartphones to help people stay aware of daily fitness progress. It provides a constantly available reminder of progress toward individual and team fitness goals.

The audience will pair up and try out the tracking technologies to get a sense of how their efforts at exercise match up to health and fitness goals and guidelines.

Process: We used smartwatch accelerometers to model and track steps taken, syncing them to a smartphone and central database to aggregate individual and team progress toward the goals established in the FitEx program. The smartwatch relays the progress to the user, providing an up-to-date view of progress to help team communication and fitness planning. The complementary program website provides a detailed portal to aid in data aggregation and visual representations of personal and group progress.

ICAT-funded project

Andrey Esakia, Computer Science, Center for Human-Computer Interaction
Scott McCrickard, Computer Science, Center for Human-Computer Interaction
Michael Horning, Communication, ICAT
Samantha Harden, Human Nutrition, Foods, & Exercise, Virginia Cooperative Extension

College of Agriculture and Life Sciences, Institute for Creativity, Arts, and Technology,
College of Engineering, College of Liberal Arts and Human Sciences

This is Your Brain on Nature

Grand Staircase

11:00 AM-4:00 PM

Discover how our brains react to different environments, and how to get more out of them! Investigate the health benefits of "forest bathing," explore the therapeutic power of mindfulness and how it changes our experience of natural spaces. Strap on your boots and EEG - This is Your Brain on Nature!

Try on an EEG recorder and see how your brain responds to simulated stress and natural stimuli in real time!

Process: To investigate how nature affects the brain, I began by studying myself. I compared the psychological effects of "forest-bathing" to those of mindfulness practice quantitatively by using a NeuroSky Mobile EEG to study metrics conveyed by the measured brain-waves. I focused on getting a baseline of indoors activity, then began recording mindful activity. I would later record casual nature hiking and intentionally mindful hiking and explore differences in the mental metrics.

ICAT-funded project, ICAT course project, ICAT-affiliated faculty project

Colin Shea-Blymyer, Computer Science

Scott McCrickard, Computer Science, Center for Human-Computer Interaction

Institute for Creativity, Arts, and Technology, College of Engineering



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

"Would you rather..." – Probing Tradeoffs with Technology in Hiking and Outdoors Settings

Grand Staircase

11:00 AM-4:00 PM

This project collects opinions on "Would You Rather" cultural probe questions to understand perceptions of technology in hiking and outdoor settings. A diverse set of previously collected data is presented, with opportunities for attendees to weigh in with their own thoughts and experiences.

A poster will summarize results from prior "Would you rather" probe sessions, and visitors will get to weigh in on their own preferences and see how their results compare to others through a tablet interface.

Process: Cultural probes seek to encourage participants to think deeply about their experiences. The "Would you rather" technique puts forth two contrasting scenarios (not opposites but mutually exclusive) that require people to choose. Answers to many questions make it possible to identify correlations in perspectives towards technology on the trails. Experiences through other events and social media have reached out to people with diverse experiences to get a wide breadth of perspectives.

ICAT-funded project, ICAT course project

Navyaram Kondur, Computer Science
Jagathshree Suryanarayanan Iyer, Computer Science

College of Engineering

Collaborative Surface System for Exploring Hiking Blog Data

Grand Staircase

11:00 AM-4:00 PM

This project presents a surface-based system which supports dynamic explorations of temporal blog data. The surface leverages intuitive touch interaction to connect machine learning technologies and data visualization to help audience members explore topics in hiking blogs.

Audience will experience state-of-the-art multitouch surface technologies, augmented by machine-learning techniques and data visualizations. They will explore blog data with touch interactions and an interactive word cloud.

Process: The demo includes a 55-inch multi-touch display and a large vertical display. The audience will interact with digital cards on the tabletop. They can highlight interesting words and cluster documents they think are similar. The visualization will generate a word cloud showing similar documents and related keywords. Audience can reflect on the visualization and have a better sense of the blog corpus.

ICAT-funded project, ICAT course project, ICAT-affiliated faculty project

Shuo Niu, Computer Science, Virginia Tech
Scott McCrickard, Computer Science, Virginia Tech
Steve Harrison, Computer Science, Virginia Tech

Institute for Creativity, Arts, and Technology, College of Engineering



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Learning about Trails: Approaches in Pathfinding, Visualization, and Linguistic Analysis

Grand Staircase

11:00 AM-4:00 PM

Data and technology capture aspects of trails, providing opportunities to plan for and reflect on hikes. Data visualizations and augmented reality use quantitative data in dynamic route planning and experience reflection. Linguistic modeling captures values from qualitative data from different trail communities.

The audience will use augmented reality to create routes, and visualization technologies to interact with 3D trail models. They will also be able to compare topic expectations to topic results.

Process: Quantitative and qualitative data are explored to understand trails. Visualizations of trails aggregate global positioning system (GPS) locations from WikiLoc, where users upload hiking location history to a public database. Hiking speeds are inferred through GPS timestamps. Linguistic modeling uses tweets collected by Defense Electronics Research Laboratory (DLRL), running Latent Dirichlet Allocation (LDA) on tweet collections relating to the Triple Crown of Hiking. Marking distant waypoints requires combining GPS coordinates with depth obtained from either triangulation or human estimation.

ICAT-funded project, ICAT course project

Abigail Bartolome, Computer Science

Phillip Summers, Computer Science

Wallace Lages, Computer Science

Doug Bowman, Computer Science

Ed Fox, Computer Science

Scott McCrickard, Computer Science

Institute for Creativity, Arts, and Technology, College of Engineering

Hiking the Appalachian Trail with Technology

Grand Staircase

11:00 AM-4:00 PM

This project represents a personal reflection on the preparation, experience, and reflection involved in bringing technology on an extended hike. The technology – including wearable cameras, voice recorders, and GPS devices – will be available for hands-on experiences with the devices and data.

Hands on experiences with the hiking-related technologies, plus the opportunity to review the data that were collected on a 53-mile hike.

Process: Based on the timeline of the hike, technology choices were made based on criteria that included durability, weight, connectivity, functionality, and power. The selected technologies include a Sony audio record, GoPro, ETON multi-purpose communication and power device, and a Garmin Fenix watch. Prior to the hike, we tested each piece of technology to ensure appropriateness for multi-day hikes. Once testing completed, the hike took place Mar 4-9. Results reflect tradeoffs in the selections.

ICAT-funded project, ICAT course project, ICAT-affiliated faculty project

Tim Stelter, Computer Science

Scott McCrickard, Computer Science, Center for Human-Computer Interaction

Institute for Creativity, Arts, and Technology, College of Engineering

Francis T. Eck Exhibition Corridor

Open (at the) Source: Sensing Place

9:00 AM – 7:30 PM

nui

11:00 AM – 4:00 PM

Collaborative Healing



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Open (at the) Source: Sensing Place

Francis T. Eck Exhibition Corridor

11:00 AM-4:00 PM

These projects—The Long View; Placing Sensors, Sensing Places; and The Disappeared Village of Vauquois—explore human interactions with physical space as well as our relationship to place through motion, memory, and time. Using cutting-edge technologies and innovative approaches, these artists and researchers, in partnership with ICAT, continue to illuminate and document our powerful and complex connection to our environment and how we define, and are defined by, place.

The Disappeared Village of Vauquois

Thomas Tucker, School of Visual Arts

Dongsoo Choi, School of Visual Arts

Erik Westman, Department of Mining and Minerals Engineering

Todd Ogle, Technology-enhanced Learning and Online Strategies

David Cline, Department of History

David Hicks, School of Education

Daniel Newcomb, graduate student, M.A. candidate, History and Education

Yves Massotte, Amis de Vauquois, France

Celine Beauchamp and Adrien Arles, Arkemine, Rescue Archeology, France

Placing Sensors, Sensing Places

Timothy Baird, Department of Geography

Pablo Tarazaga, Department of Mechanical Engineering

David Kniola, School of Education

Sa'ed Alajlouni, Ph.D. candidate, Department of Mechanical Engineering

Sachin Bharambe, M.S. candidate, Department of Electrical and Computer Engineering,

The Long View

Rachel Weaver, School of Visual Arts



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

nui**Sandbox windows**

11:00 AM-4:00 PM

Nui aims to create new user interfaces through extreme simplification. Since the first computer, developers and designers have been changing and optimizing user interfaces through the shift from purely text to the addition of colors, graphics, icons and transitions. Our goal is to reimagine the norm of user interfaces and push beyond the dominant use of text and icons. Nui explores a new future of user interfaces through colors, shapes, and transitions.

Our presentation includes different user interface prototypes, including weather and navigation apps. We have two interactive prototypes as well as sketches and mockups of other ideas.

ICAT course project: CS 4644, Creative Computing

Rupin Khera, Computer Science student

Bridget Larcher, Computer Science Student

Jordan White, Computer Science Student

College of Architecture and Urban Studies, College of Engineering

Collaborative Healing

Sandbox windows

11:00 AM-4:00 PM

Collaborative Healing is a mixed media sculpture using glass, LEDs, and wire. It represents the story of personal tragedy, and how working with friends and family on your passions can help you to heal.

The project is an art exhibit accompanied by a projection of photos of the process

Process: The glass sculpture was created in the artist's glassblowing studio. The LEDs are connected to a single board computer, through which the patterns are controlled.

ICAT course project: CS 4644, Creative Computing

Jodie Burnett, Computer Science

Jake Szymanski, Artist

College of Engineering

Merryman Family Learning Studios

Learning Studio (253)

11:00 AM – 4:00 PM

The Middle Experience

D.O.O.M.

Shattered Lenses

Light Wall

Neutral Focus

Pensieve

C-OLiVE: Playing and learning together inside a steam-powered olive oil production factory

Observation Room (251)

11:00 AM – 4:00 PM

Mirror Worlds

Elementary

Many of the projects in the Merryman Family Learning Studio are part of a Creative Computing course.



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

The Middle Experience

Merryman Family Learning Studio

11:00 AM-4:00 PM

The Middle Experience explores empathy through combining two individual experiences - both centered on one common emotion. Through imagery, sound, and light in an immersive environment, we hope to give each visitor a unique interplay with someone else's story that lends to personal connection.

The audience will experience the enmeshed story through narration over headphones, and visual images projected onto a screen – all inside an enclosed booth. We are also hoping to add in light and music installation as well to the experience.

Process: We will build a front end survey to ask visitors about the actors and objects in an experience they had surrounding a common emotion such as betrayal, joy, or confronting their greatest fear. Based on their input we will use Computer Vision to search the web for images to match. After they enter the booth and put on headphones, the narration of an experience built on the same emotion will play using bluetooth. Images cached earlier will project onto a screen to complement and personalize the story.

ICAT course project: CS 4644, Creative Computing

Melanie Trammell, Computer Science

Jacob Stenzel, Computer Science

Ishita Ganotra, Computer Science

Mary Kwiatkowski, Computer Science

College of Engineering

D.O.O.M.**Merryman Family Learning Studio**

11:00 AM-4:00 PM

D.O.O.M. is a visual experience that projects issues we consider deadly or taboo. This project explores what fear is and the many forms that it can take.

The audience will watch a ghost move around the room with a projector displaying different images.

ICAT course project: CS 4644, Creative Computing

Jazmine Zurita, Computer Science/Creative Computing Studio

Patrick Sihh, Computer Science/Creative Computing Studio

Evan Shaw, Computer Science/Creative Computing Studio

Zakeel Muhammad, Computer Science/Creative Computing Studio

Shattered Lenses

Merryman Family Learning Studio

11:00 AM-4:00 PM

Shattered Lenses is a 2D game where the response to scary events is to close the eyes of the avatar which will produce a different scene/situation.

A single user may experience the game on a computer. The game's creators will be on hand to answer questions.

Process: We are using Unity to create an engaging narrative game. All graphical art and music are created using other programs and help set the mood of the game. We aim to showcase our game on a computer during ICAT day in an isolated section to better set the mood. The exhibit will be managed by our team of programmers during the event.

ICAT course project: CS 4644, Creative Computing

Sarah Devlin, Computer Science

Christian Richardson, Computer Science

Tiffany Tran, Computer Science

Paco Gallegos, Computer Science

Institute for Creativity, Arts, and Technology

Light Wall

Merryman Family Learning Studio

11:00 AM-4:00 PM

The light wall is a visual representation of sound. It highlights and encourages in-person interaction by creating waves of light that propagate and change color as it picks up audio around it. The goal is to bring together an abstract concept with visualization through a physical model.

The lights will be mounted on a wall and the audience will be asked to have conversations near different areas of the board, showing its ability to locate the sound and activate the lights.

Process: We used an LED board with a single board computer to control the lights and multiple microphones to detect the sound.

ICAT course project: CS 4644, Creative Computing

Daniel Gil, Computer Science

Meghan Hamannwright, Computer Science

Michael Liu, Computer Science

Alan Kai, Computer Science

College of Engineering

Neutral Focus

Merryman Family Learning Studio

11:00 AM-4:00 PM

In an attempt to challenge traditional ideas on focus, Neutral Focus uses eye tracking technology to monitor where people look on an image. The image adjusts to spread their focus dynamically until no part dominates attention.

One person is creating the art by sitting at a laptop. Everyone else sees what they are creating in real time.

Process: Neutral focus art pieces will be developed beginning with a traditional piece of art. The viewer's focus will be determined by eye-tracking technology. The image will change to shift focus away from focal hot spots dynamically until a final neutral focus piece is created.

ICAT course project: CS 4644, Creative Computing

Ian Jelliffe, Creative Computing

Matt Deasy, Creative Computing

Nam Nguyen, Creative Computing

College of Engineering



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Pensieve

Merryman Family Learning Studio

11:00 AM-4:00 PM

Pensieve is a website that allows users to listen to various stories about experiences around Blacksburg. While listening, users will be able to see a picture of the story's setting and immerse themselves in the story.

The audience will be able to interact with the website and listen to the stories we have collected.

Process: We began by gathering and recording stories from people around Blacksburg about their experiences in the area. We took photographs of the settings of the stories and the person telling the story. Then we combined the audio recordings and photographs on a website.

ICAT course project: CS 4644, Creative Computing

Hanna Vess, Computer Science
Elizabeth Villaflor, Computer Science
Derek Messer, Computer Science
Lauren Cahill, Computer Science

College of Engineering, College of Liberal Arts and Human Sciences

C-OLiVE: Playing and learning together inside a steam-powered olive oil production factory

Merryman Family Learning Studio

11:00 AM-4:00 PM

C-OLiVE is a digital game for large groups, where players are immersed in a virtual olive oil production factory. Players use Xbox controllers and iPad devices to work together as a team and produce (virtual) olive oil. Real extra virgin olive oil will be tasted by anyone producing virtual oil!

"The students had a great time in your workshop and were enthusiastic to share their experience with their peers," was a comment I got recently from my collaborator at the Franklin Institute (Philadelphia). Middle/high-school students (and adults) can join a group and play together a digital game, presenting the engineering concepts behind olive oil production. This is a highly interactive event where people play together on a front-projected screen using game controllers and iPads.

Process: We used 3D modelling software (Maya, 3D Studio Max) to create the 3D machine models and the virtual environment. Then we used a real-time game engine (Vizard) to setup the virtual world and do the interaction programming. HTML, javascript, and websockets were used for the communication of the game with the iPad devices over a wireless network. Finally, all 3D machine models were 3D printed, after proper editing and preparation, and painted with an airbrush, and will be on display during the show

ICAT-funded project, ICAT-affiliated faculty project

Panagiotis Apostolellis, Computer Science, ICAT

Doug Bowman, Computer Science, ICAT

Reza Tasooji, Computer Science, ICAT

Ellie Nikoo, School of Visual Arts



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Mirror Worlds

Merryman Family Observation Room

11:00 AM-4:00 PM

The Mirror Worlds is a research infrastructure that provide a shared platform for interaction between real world and virtual world.

The audience will see various displays that spread across the building.

Process: We used ceiling-mounted cameras around the building and use blob tracking, a computer vision algorithm to track people around the building, and put them into a virtual model of this building, developed in Unity. Now both physical people and people from remote locations are in the same virtual space.

ICAT-funded project

Nuo Ma, Electrical and Computer Engineering
Archi Dasgupta, Architecture
Mark Manuel, Computer Science
Sachin Bharambe, Electrical and Computer Engineering
Jackie Messe, Computer Science
Nicholas Polys, Computer Science
Benjamin Knapp, Electrical and Computer Engineering

Institute for Creativity, Arts, and Technology, College of Engineering

Elementary

Merryman Family Observation Room

11:00 AM-4:00 PM

Elementary is an illustrated story about some elementary school kids going about their day. The story is embedded in generative, fractal illustrations which draw parallels between the behavior of the children and other natural systems, exploring the similar patterns in all things.

The audience will read a projected story as it is procedurally rendered, line by line, within a procedurally generated, animated illustration. A Kinect will allow the audience to pan and zoom through the fractal field of the illustration.

Process: This project is part of the CS 4644 Creative Computing Studio. The story is written by my brother, Jesse Rowan, an undergraduate in Creative Writing at the University of Montana. The illustrations are created with Processing, with some frameworks to help with performance, and to interface with the Kinect.

ICAT course project: CS 4644, Creative Computing

Padraic Rowan, Computer Science
Jesse Rowan, University of Montana

College of Engineering

Mezzanine Lobby

VTArtWorks

11:00 AM – 4:00 PM

Personalized Paths

Civil War Photo Sleuth

GroundTruth: Supporting Open Source Investigative Journalism with Crowdsourcing

Incite: Connecting Historical Documents to Scholarly Topics via Crowdsourcing

Connect the Dots: Supporting Intelligence Analysis with Crowdsourcing and Visualization

Design for America

smART field

Analog Geo



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

VTArtWorks

Mezzanine Lobby

11:00 AM-4:00 PM

VTArtWorks is building an online portal for the field of Community Cultural Development (CCD), allowing users ready online access to knowledge, research, best practices, and each other. The web technology offers unique interactivity between its communication platform and its digital repository.

As an accessible technology for both arts and non-arts partners, VTArtWorks staff will be on hand to demonstrate the communication and repository capabilities of the resource while allowing audiences to interact with the prototype site in a hands-on manner.

Process: The predecessor of VTArtWorks was the Community Arts Network, an online journal for the field of community cultural development (CCD) that went dormant in 2010. In 2013, a convening at Virginia Tech of several CCD organizations nationwide led to the conception of this project, providing an online space for interdisciplinary communication and documentation among practitioners in the field. In early 2017, VTArtWorks partnered with CoLab Collective to build the first iteration of the online CCD resource.

ICAT-funded project, ICAT-affiliated faculty project

Bob Leonard, Theatre Arts

Andi Ogier, Newman Library

Thomas Murray, Theatre Arts

Kurt Luther, Computer Science

Quinn Warnick, Technology-Enhanced Learning and Online Strategies (TLOS)

Kristin Rose Kelly, Theatre Arts



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Personalized Paths

Mezzanine Lobby

11:00 AM-4:00 PM

Personalized Paths is a project that aims to combine human intelligence and computer power (algorithm) to help users in emergency situations evacuate the built environment.

The audience will experience an active-engagement demo of our smartwatch app and a demo of our web applications

Process: We developed an Android app that connects a server to a phone and a smartwatch, so we could send directions from the web application to the smartwatch. We then used ICAT's Mirror Worlds project cameras to observe, record, and direct participants to safety based on the directions they were receiving from us on their smartwatches.

ICAT-affiliated faculty project, ICAT-affiliated student project

Kurt Luther, Human-Centered Design, Computer Science
Navid Falla, Human-Centered Design, Computer Science
Allison Collier, Computer Science

Institute for Creativity, Arts, and Technology, College of Engineering

Civil War Photo Sleuth

Mezzanine Lobby

11:00 AM-4:00 PM

Civil War Photo Sleuth is a system that uses a combination of the state-of-the-art face recognition techniques and the power of crowdsourcing to help you discover the identity and history of soldiers in historical photos.

Audience will be given a demonstration of a working prototype of our application.

Process: Given a mystery photo, we make relevant suggestions by the matching the face in the mystery photo to faces in our database. Besides that users can use other filters to further narrow down the results. In the case of a large number of results we help scale the investigation by dividing the tasks into small chunks and hiring online crowd workforce to work on those chunks.

ICAT-affiliated faculty project

Sneha Mehta, Computer Science

Kurt Luther, Computer Science

College of Engineering

GroundTruth: Supporting Open Source Investigative Journalism with Crowdsourcing

Mezzanine Lobby

11:00 AM-4:00 PM

GroundTruth is a crowdsourcing platform that enables crowd workers to support journalists in the geolocation of image and video media using open source investigation techniques, a vital task in the verification of user-generated content.

Audience members will learn more about the motivation for the project as well as have an opportunity to use the software themselves. Participants will get to experience an investigation from the perspective of a crowd worker.

Process: We conducted extensive interviews with a variety of journalists. After learning about their processes and challenges, we developed a strategy to parallelize the journalists' process of searching satellite imagery across crowd workers. We created a web-based software using open source technologies such as Google Maps and Street View that allows a crowd worker to participate in a larger search effort through Amazon's Mechanical Turk.

ICAT-affiliated faculty project

Rachel Kohler, Computer Science
John Purviance, Computer Science
Caroline Ritchey, International Studies and History
Kurt Luther, Computer Science

Institute for Creativity, Arts, and Technology, College of Engineering, College of Liberal Arts and Human Sciences

Incite: Connecting Historical Documents to Scholarly Topics via Crowdsourcing

Mezzanine Lobby

11:00 AM-4:00 PM

We are going to exhibit Incite, which may help users learn about history by transcribing historical primary sources, tagging different entities and events in these sources, and connecting these sources to high-level concepts that historians use for their research.

The audience will have a new experience with digital humanities because now not only can they see primary sources they do not usually see but also interact with these sources and get involved in the history research!

Process: We built Incite, a plugin to a well-known web-based content management system, Omeka that consists of various web technologies including HTML, CSS, Javascript, PHP, and MySQL. We also searched, collected, and stored various primary sources such as newspaper clips, personal diaries, and public speeches on the server for further analysis and research. We then studied different methods to make the working process and results helpful for historical research and education.

ICAT-funded project, ICAT-affiliated faculty project

Nai-Ching Wang, Computer Science
Abby Jetmundsen, Industrial Design
Julia Rater, Visual Communication Design
Liyang Li, Computer Science
David Hicks, Education
Paul Quigley, History
Kurt Luther, Computer Science, ICAT

Institute for Creativity, Arts, and Technology, College of Engineering, College of Liberal Arts and Human Sciences



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Connect the Dots: Supporting Intelligence Analysis with Crowdsourcing and Visualization

Mezzanine Lobby

11:00 AM-4:00 PM

Connect the Dots is a crowdsourced sensemaking project. It explores how novices can support intelligence analysis of text documents by disassembling the sensemaking process into small components with clearly defined inputs and outputs as well as data flow.

The audience will be interacting with a set of fictional text documents called *The Sign of Crescent*, in which three implicitly collaborated terroristic scheming activities are diffused and obfuscated. The data will be presented in a few different formats in the web application we developed for the project, to demonstrate different stages of sensemaking process. The audience can take the role of expert analyst to guide the sensemaking process, or they can pretend to be a crowdworker taking on a microtask in a component. They will interact with the corresponding data using the web software.

Process: We went through previous works on sensemaking process to understand the state-of-art theories and models. Then we aggregated and adapted existing works to a pipeline for the problem we are tackling. We developed a web application for a component in the pipeline, where text documents are read and the information contained is extracted. Then we conducted an empirical case study with crowdsourcing on Amazon Mechanical Turk. The results are visualized in a variation of the microtask interface.

ICAT-affiliated faculty project

Tianyi Li, Computer Science

Chris North, Computer Science

Kurt Luther, Computer Science

Design for America

Mezzanine Lobby

11:00 AM-4:00 PM

Design for America students present a collection of human-centered design projects ranging from a prosthetic hand to sustainability education. All projects are done by interdisciplinary students and have been working on creating an impact on the local community.

We will show off the prototypes of our projects and have a Q+A format as well as a short pitch of what each project team did.

Process: Different projects used a slightly different approach. However, all projects follow the 6-step design process to create impact. Step 1 is to identify the problem. Next teams immerse themselves into the problem and do research. They then come up with a more focused research question, ideate/brainstorm ideas, and build and test their ideas. Throughout the process, they get feedback from community members.

ICAT course project

Taylor Bennett, General Engineering
Josh Hull, Mechanical Engineering
Amy Grupenhagen, Mechanical Engineering
Celine Stewart, Computer Engineering
Chris Evers, Computer Engineering
Jessica Peterson, Interior Design
Sean Pickering, Architecture
Arianna Krinos, Computer Science
Anna Mumma, Mechanical Engineering
Christine Junod, Industrial Systems Engineering
Zachariah Turner, Industrial Systems Engineering
Justin Lau, Industrial Design

College of Architecture and Urban Studies, College of Engineering

The banner features a blue background with a white graphic of a globe or network of lines on the left. The text is white and centered on the right side.

ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

smART field

Mezzanine Lobby

11:00 AM-4:00 PM

The smART field re-envision the pedestrian paths on the Drillfield. It collects data on the activities of people on campus, harvests energy from foot traffic, and reconceives the walking surface as a lighting and sensing instrument. At night it communicates through subtle variations of light.

We will install a one-to-one scale, 45-foot long prototype of the pathway LEDs and sensors. The outlines of the 6-foot wide pavement will be marked with tape on the floor. As a visitor walks, the path will illuminate a few footsteps ahead of them. They will be able to watch animations and renderings showing the overall project design, and to examine full-scale prototypes of the concrete pavers, electromagnetic energy harvesters and light fixtures.

Process: smART field is developed by faculty and students in Architecture, Design, Engineering, and the Center for Energy Harvesting Materials and Systems. Over Fall 2016 and Spring 2017, we collaborated on iterative design of interactive lighting, energy harvesters, and atmospheric effects. The team engaged stakeholders including the Virginia Tech planning department, campus police, and ADA (Americans with Disabilities Act) accessibility services. Arup Lighting in New York City is providing input on lighting safety, luminance, and fixture specifications.

ICAT-funded project, ICAT-affiliated faculty project

Muhammad Hajj, The Center for Energy Harvesting Materials and Systems, Department of Biomedical Engineering and Mechanics

Aki Ishida, School of Architecture + Design, ICAT

Brook Kennedy, School of Architecture + Design, ICAT

Margarita McGrath, School of Architecture + Design

Lei Zuo, The Center for Energy Harvesting Materials and Systems, Mechanical Engineering

Undergraduate Students:

Abdulazeez Albanyan, Mechanical Engineering
Suzanne Berry, Architecture
Leira Carreon, Architecture
Austin Chase, Landscape Architecture
Daniel Choi, Industrial Design
Luke Dale, Architecture
Anuja Das, Architecture
Michael Folta, Architecture
Elizabeth Harris, Architecture
Megu Kamiya, Landscape Architecture
Rui Lin, Mechanical Engineering
Matt Nabers, Mechanical Engineering
Sehyung Nam, Mechanical Engineering
Rachael Skolnekovich, Architecture
Yilun Yu, Mechanical Engineering

Graduate Students:

Archi Dasgupta, Architecture
Mingyi Liu, Mechanical Engineering
Deba Pratim Saha, Computer Engineering
Joshua Treadway, Architecture

Institute for Creativity, Arts, and Technology, Institute for Critical Technology and Applied Science, College of Architecture and Urban Studies, College of Engineering



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER

Analog Geo

Mezzanine Lobby

11:00 AM-4:00 PM

Analog Geo is a collaborative effort by the Geosciences Modeling and Educational Demonstrations Laboratory (MEDL), the Museum of Geosciences (MoGS), and members of the Geology Club at Virginia Tech to put geologic processes into the hands of learners through the use of physical analog models.

The audience will be able to view and use hands-on physical analog models used for better understanding geologic processes.

Process: The materials we use have analogous physical properties to those of the Earth. The materials are mostly everyday materials available to the average consumer. We can combine these materials to create an analogous system, which is often needed for modeling geological systems. Additionally, some of our models can be equipped with sensors in order for users to get a sense of how scientists use data to better understand geologic processes.

Gary Glesener, Geosciences Modeling and Educational Demonstrations Laboratory
Llyn Sharp, Museum of the Geosciences
Christiana Hoff, Geology Club
Geology Club Members

College of Science

Balcony Lobby

Project Calidus: Automated Child Car Cooling Device	9:00 – 10:00 AM and 11:00 AM – 12:00 PM
SmartPurse	
The Novis sedis Bike Camper	
Safe Glove	
The Mini-Beethoven: A Music Tutor for the Visually Impaired	
The Heads Up Helmet	
Project Iris	
Movable Home	
Augmented Reality Sandbox	
Hologram Conference Display	
Eye-Robot: Navigational Aid for the Visually Impaired	
VisiBoom: A system for providing auditory awareness in an isolated environment	
The Engineering of an Automated Task Completing Robot	

Projects on the Balcony Lobby are part of the Virginia Maker Conference, in which high school students from across the state share their inventions and designs. The Virginia Maker Conference is directed by Sam Blanchard and Phyllis Newbill.

Project Calidus: Automated Child Car Cooling Device

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Governor's School at Innovation Park

The device is a cooling system that uses thermoelectric cooling to lower the temperature of an enclosed environment. A poster and portfolio will also be brought to help present the idea and summarize the engineering process of constructing the device.

The audience will be able to interact with the device and will be invited to feel the temperature difference on either side of the cooling device. They will also hear the soothing lullaby that will be playing while the device is active.

Paulina Hall

Brightney Varghese

Anika Iyer

SmartPurse

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Governor's School @ Innovation Park

We will bring a purse that has lights inside and that has a sensor that communicates with a bracelet to vibrate when the purse opens.

The audience will see a demonstration of the purse working and will receive an explanation as to how it works.

Amanda Gift

Rosemary Rozario

Samra Mirza

The Novis sedis Bike Camper

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Patriot High School
Governor's School @ Innovation Park

At the exhibit, we will have the bike camper, a bicycle, a poster describing the design, and a monitor to display a video showcasing the design in use.

At our exhibit, the main feature will be the bike camper itself. We will be encouraging the audience to step inside the camper to experience it for themselves. We will also have a video demonstrating the different components as well as night stays in the camper. Finally, we will be encouraging the audience to leave a note on the camper by writing with chalk on the outside.

Alex Chavez
Jarrett Lash
Nathan Yang

Safe Glove

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Forest Park High School
Governor's School @ Innovation Park

Our group will bring a revolutionary innovation that will severely reduce contamination associated with glove removal as well as disposal through mechanical removal of gloves used in a medical and/or laboratory setting.

Audience will have the opportunity to participate in a live demonstration in which they will get to put on a glove and then have it removed by the product. This will be supplemented with our poster.

Nicholas Buie
Katy Carney
Joshua Ralston

The Mini-Beethoven: A Music Tutor for the Visually Impaired

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Governor's School @ Innovation Park

We are bringing a poster board and our prototyped piano keyboard.

The audience will experience the visual component of the poster board and will hear some of the notes that can be played through The Mini-Beethoven. Those who are desiring to try the piano will be permitted.

Diego Villatoro

John Ventura

Stuart Scarton

The Heads Up Helmet

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

The Governor's School at Innovation Park

We will bring our prototype Heads Up Helmet (HUH) and a poster. The HUH is a football helmet with a built in inertial measurement unit (IMU) board and liquid crystal display (LCD) screen. The IMU board will help with concussion detection, while the screen can display the player's playbook.

At the exhibit, the helmet will be present along with other materials. A computer will display a slideshow so the viewer may see the building and testing process. Also, brochures will be present for the viewers to take and read about the HUH. A poster will display the main concepts and figure of the HUH. Overall, the viewer will be able to inspect the helmet and view the LCD functions in action.

Michael Lawrence

Isabella Posey

Jonathan Raisigel

Project Iris

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Governor's School at Innovation Park

We will bring a functioning prototype (portable touchscreen device) and a poster. The name of this device is Iris because Iris is the Greek Goddess of rainbows and a part of the eye. It was only fitting to name the device after something related to color perception and colors in general.

Members of the audience will be given a tie-dyed piece of paper and a black marker; they will be told to write, on various color sections of the sheet, the emotion that each color on the sheet makes them feel. The audience members will then compare their sheets with the sheets of the people around them. Because the emotions people associate with different colors vary from person to person, there will be some differences. This variation will help demonstrate how unique each individual truly is and the relevance of this project.

Sharon Sarang

Yara Snawy

Brooke Landreaux

Movable Home

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Governor's School at Innovation Park

We will be bringing a model of our Movable Home, which is a customizable shelter designed for homeless people, refugees, and natural disaster victims. The project is composed of square plastic panels and rectangular connection pieces. Using these, the shelter can be built to any square or rectangular dimension so that the user can have their home fit to the space available to them, which is especially important in crowded cities. Since the pieces are composed of plastic, the home will be very sturdy and waterproof. On the top panel of the Movable Home there will be solar panels which will allow for a LED light strip controlled by a photocell to be charged by solar power and automatically turn on when it is dark. There will also be a switch provided so it can be turned off while the person is sleeping. To allow air-flow and easy accessibility the door will be made of a mesh with a magnetic strip down the middle to hold it closed when not in use yet be easy to separate when the occupant wishes to leave. The home will be easy to transport as it can be broken down into the individual panels and easily added to a cart or held in place with a band so the person can take their home with them.

The audience will be given a chance to interact with our finished product. The visitors may choose to set up the Movable Home and explore the interior of the shelter. The audiences may manipulate the LED light by a switch or by covering the solar panels. Audience members may draw on the panels and each person that comes by our project can add to it until the presentation time is over.

Anne Bray
Cristina Fronea
Mengyun Liu

Augmented Reality Sandbox: Interactive experience showcasing changing topographical maps

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Governor's School at Innovation Park

We are bringing a portable box that contains sand in it. On top of the sand box, a projector and a Kinect will be mounted to create a topographical projection on the sand.

The audience will be able to interact with the sand in the sandbox and will be able to visually see the effect of molding the sand on it a topographical image that is projected on the sand in real life. Furthermore, the audience will be able to simulate rain and see the effect on it on the sand's topography.

Syed Saquib
Yaman Shrestha
Alex Hughes

Hologram Conference Display

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Freedom High School
Governor's School at Innovation Park

This invention creates a three-dimensional hologram of individuals, objects, and virtual models to improve communication in conferences. To accomplish this, the invention utilizes a rapidly spinning LCD (liquid crystal display) screen that displays different perspectives of the subject at each angle. This design takes advantage of the persistence of vision illusion to form a complete, three-dimensional image from these different perspectives.

The audience will be able to observe various examples of three-dimensional holograms created by the invention.

Rebecca Hawkins
Julius Hunt
Ethan Passmore

Eye-Robot: Navigational Aid for the Visually Impaired

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

New Horizons Regional Education Center
Governor's School for Science and Technology

A prototype Eye-Robot will be available for use, and a small walking simulation course for people to try the product. A tri-fold board will show the components of the Eye-Robot, the process that went into making it, and future development.

The navigational technology of the Eye-Robot will enhance the user's environmental sense of place, even if the user is visually impaired. Additionally, tourists who use this device will be able to connect with their cultural surroundings and focus more on what is around them rather than where they are going.

Michael Hendrickson
Rylan Flint
Elizabeth Horley
Caroline Kersey
Brittany Kinslow
Jesse Nelson

VisiBoom: A system for providing auditory awareness in an isolated environment

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

New Horizons Regional Education Center
Governor's School for Science and Technology

We will have a functioning VisiBoom prototype that will directionally detect and interpret auditory information with visual and haptic output. Final product features and functionality surveys of experts in the unmanned and autonomous systems industry and local deaf drivers will be on display. Additionally, the in depth process of the creative design and development of the three components of VisiBoom will be displayed.

The VisiBoom system is intended entirely to aid individuals in having a better understanding of their vehicular physical and aural place. As vehicles become more autonomous, drivers are becoming further disconnected from the ever-important sounds happening around them. Our project aims to bridge this gap so that the user might have the same cognitive awareness, though through alternative sensations, in the vehicular place.

Tanner Loper
Nir Diskin
Siddhant Mehrotra
Alexander Kleb
Tavaris Noel

The Engineering of an Automated Task Completing Robot

Balcony Lobby

9:00 AM-10:00 AM

11:00 AM-12:00 PM

Roanoke Valley Governor's School

We will bring the robot and project board.

The audience may view the robot and interact with the presenters.

The robot has the ability to sense its surroundings, make decisions, and execute commands based on its senses. It also has the ability to follow a black line and collect balls.

Devin McCulley

Bryce Morrison

Ryan James

Stephen Olsen

Garrison Richmond

Credits

Institute for Creativity, Arts, and Technology Staff

Benjamin Knapp, director
Tom Martin, associate director
Liesl Baum, research assistant professor
Zach Duer, immersive environment specialist
Lisa Jansen, grant specialist
Phyllis Newbill, outreach and engagement coordinator
Tanner Upthegrove, media engineer
Holly Williams, program and business operations manager
Melissa Wyers, administrative assistant

Moss Arts Center Staff

Artistic/Programming

Ruth Waalkes, executive director, Moss Arts Center, and associate provost for the arts
Sara Bailey, program manager
Jon Catherwood-Ginn, associate director of programming
Margo Crutchfield, curator at large
Kari Evans, executive assistant
Meggin Hicklin, exhibitions program manager

Development

Lois Badey, senior director of development
Chris Bartlett, assistant director of development for leadership gifts

Finance and Administration

Liz Scharman, director of administration
Kevin Ayoub, facilities manager
Toni Cartee, fiscal and human resources specialist

Steve Cox, IT specialist
Shirley Rose, housekeeping worker
Mark Seagraves, housekeeping worker
Kelly Stanley, administrative services manager

Outreach

David Ehrlich, outreach fellow for the fine arts
Anne Elise Thomas, building bridges research fellow and itraab ensemble music director

Marketing and Communications

Heather Ducote, director of marketing and communications
Reneé Alarid, associate director of creative services
Susan Bland, associate director of communication
Jonathan Boulter, associate director of patron services
Carly DuPont, house manager
Avery Eliades, digital content specialist
Tracie Hughes, marketing coordinator
Kacy McAllister, box office manager

Production

Doug Witney, director of production
Gustavo Araoz, lighting supervisor
Nick Corrigan, senior technician
Joe Ingram, staff technician
Robert Gainer, audio supervisor
Laine Goerner, production coordinator
Ryan Hasler, stage and rigging supervisor



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE
MONDAY, MAY 1, 2017 MOSS ARTS CENTER



VirginiaTech

Institute for Creativity,
Arts, and Technology



ICAT CREATIVITY AND INNOVATION DAY
SENSING PLACE

MONDAY, MAY 1, 2017 MOSS ARTS CENTER