



INSTITUTE FOR  
CREATIVITY,  
ARTS, AND  
TECHNOLOGY

# ICAT DAY

MONDAY, MAY 2, 2016 | MOSS ARTS CENTER

IF YOU... EXPERIENCE, PLAY, LEARN, GROW, INVENT

ICAT Day is a celebration of the work of Virginia Tech's Institute for Creativity, Arts, and Technology. Interactive exhibits, demonstrations, speakers, and performances at the Moss Arts Center show how ICAT is forging pathways among transdisciplinary research and artistic output, scientific and commercial discovery, and educational innovation. The ICAT community will share engaging experiences in dance, game design, music, innovation, social justice, digital humanities, data visualization, and human-computer interaction. Together, we will explore the **possibilities** of working at the nexus of science, engineering, arts, and design.

The event is free and recommended for ages 13 and up.

For more information, contact Phyllis Newbill at [pnewbill@vt.edu](mailto:pnewbill@vt.edu) or visit [www.icat.vt.edu](http://www.icat.vt.edu).

## EVENTS

- 9 AM** Governor's School Maker Conference Exhibits
- 10 AM** Keynote with Diavolo: Architecture in Motion in the Anne and Ellen Fife Theatre
- 11 AM-4 PM** Exhibits throughout the building and ICAT: Open (at the) Source, The Macronaut Project in the Francis T. Eck Exhibition Corridor
- 3 PM** Performances in the Cube
- 4:30 PM** Awards Ceremony in the Anne and Ellen Fife Theatre
- 6 PM** Concert in the Grand Lobby
- 7:30 PM** DISIS Spring Concert in the Cube



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## LEARN...

### **GOVERNOR'S SCHOOL MAKER CONFERENCE**

9:00 AM-12:00PM

*Balcony Lobby*

Governor's School students from around the Commonwealth will show their inventions.

### PROCESS

"High school students across Virginia used the design process to prototype and build a new invention."

Phyllis Newbill, ICAT  
Mountain Vista Governor's School  
Governor's School @ Innovation Park  
New Horizons Governor's School



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## EXPERIENCE...

### **OPEN (AT THE) SOURCE: MACRONAUT**

9:00 AM-9:00 PM

*Francis T. Eck Exhibition Corridor*

Macronaut is a smart phone-compatible magnifying lens that allows individuals to see, in staggering detail, the wonders of natural phenomena around us. This exhibition showcases biological journal photographs taken by Kennedy's students in his Integrated Biology and Design class.

Brook S. Kennedy, ICAT Fellow, Industrial Design



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## KEYNOTE ADDRESS

### **DIAVOLO | ARCHITECTURE IN MOTION**

10:00 AM-11:00 PM

*Anne and Ellen Fife Theatre*

Since Spring 2015, artistic director Jacques Heim and scene designer Daniel Wheeler of DIAVOLO | Architecture in Motion® have been collaborating with Virginia Tech faculty and graduate students through periodic residencies at the university to develop Diavolo's next piece, Luminoir. Drawing from visual arts, architecture, electrical engineering, and computer science, this team has been exploring the creation and integration of cutting edge technology into Luminoir. Learn more about this ongoing collaboration among DIAVOLO, the Center for the Arts, and ICAT at this kick-off keynote to ICAT Day.





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## EXPERIENCE...

### PLASMA

11:00 AM-2:00 PM

*Cube*

Plasma is a computer generated particle sphere that users can interact with through the use of a LEAP Motion. By using their hands they can pull tendrils out from the orbs core, generating interactive visual effects and a 9 channel sound system.

### PROCESS

"Through the use of Max7 I created my own computer generated physics environment and particle system. This particle system is modeled on the Plasma Balls popular through out my childhood. Audience members can interact with the physics environment by interfacing with a LEAP Motion hand tracking camera. By moving their hands the audience can pull tendrils out from the central mass in 3 dimensions. Hand movement also controls an 8.1 channel spatial audio system creating a fully immersive experience."

George Hardebeck, School of Visual Arts, ICAT



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## INVENT...

### SYSTEM OF LARGE ADDITIVE MANUFACTURING ROBOTICS

11:00 AM-2:00 PM

*Cube*

The System of Large Additive Manufacturing Robotics (SLAMR) is a 3D printer comprised of an six degrees-of-freedom industrial robotic arm and a custom designed thermoplastic extruder. 3D objects are created by depositing plastic one layer at a time.

#### PROCESS

"We start with a 3D model and slice that model into layers using a program like Slic3r. Slic3r generates a series of points that the tip of our plastic extruder will follow. These points are then used to compute the six joint angles required to move the robotic arm to that point. This series of robot poses are transferred to the robot one layer at a time and while the robot moves to each position, commands are sent to the extruder to extrude the right amount of plastic."

Christopher Williams, Mechanical Engineering  
Matthew Price, Mechanical Engineering  
Taylor Pesek, Mechanical Engineering  
David Titch, Mechanical Engineering  
Mark Traverso, Mechanical Engineering  
Oliver Ebeling-Koning, Mechanical Engineering  
Zack Snow, Mechanical Engineering  
Edward Cottiss, Mechanical Engineering  
Joseph Kubalak, Mechanical Engineering





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## PLAY...

### HURRICANE HUNTERS – UNDERSTANDING HURRICANES

11:00 AM-2:00 PM

*Cube*

Brave pilots fly into the eyes of approaching hurricanes gathering data on the storm for better prediction of its future movements. Come and be a hurricane hunter as you move through Hurricane Charley, which battered the west Florida coast near Punta Gorda. You will be piloting a virtual plane passing over the eye and eye wall as it comes ashore.

#### PROCESS

“The purpose of this project was to take a big data source (NEXRAD weather radar) and produce a fully accurate image of the instantaneous form of a severe weather event. A weather event is made up of over 200,000 points in a cloud from a NEXRAD weather radar site. Each point in the point cloud has a three-dimensional (latitude, longitude, altitude) position and a radar reflectivity indicating the amount of radar energy that bounced off of the ‘air’ in that area and returned to the radar site. The ground image is terrain and land cover from the National Map produced by a Geographic Information System.”

Bill Carstensen, Geography

Dave Carroll, Geography

Trevor White, Geography

Kenyon Gladu, Geography

Zack Duer, ICAT



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## LEARN...

### **3D METEOROLOGICAL IMMERSION EXPERIENCE: HURRICANES AND TORNADOS IN THE CUBE**

11:00 AM-2:00 PM

*Cube*

This project worked closely with the researchers who have developed the Tornado in a Cube project. Our role was to look at the project and apply the learning sciences lens. We will discuss different educational benefits of this immersion experience.

#### PROCESS

"We researched different learning sciences trends and figured out which ones could be applied to this project."

Marina Sotelo, Instructional Design and Technology

Roberto Carlos Flores, Instructional Design and Technology

Sarah Sweeten, Instructional Design and Technology



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## EXPERIENCE...

### **DENSE SPACE**

11:00 AM-4:00 PM

*Experience Studio*

Dense Space is a responsive audiovisual environment. It explores the use of linear fibre material to generate forms that in their interplay with light and motion densify the space, increasing its presence, and augmenting the experience of space.

### PROCESS

"Exploring the making of form with different yarn material, we search for greater flexibility of form, of increasingly larger size and lighter weight. In this series we explored wool, then carbon fibre, and lastly glass fibre, all materials that when mixed with resin create rigid forms. These forms, interlaced with optical fibers, interact with Raspberry Pi-controlled light, sound, and motion in the space to create imaginary environments."

Paola Zellner, Architecture, School of Architecture + Design

Tom Martin, Electrical and Computer Engineering

Michael Bednar, Architecture, School of Architecture + Design

Adam Burke, Architecture, School of Architecture + Design

Brian Heller, Architecture, School of Architecture + Design

George Hardebeck, Creative Technologies, School of Visual Arts



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### **KRINKLE COLLABORATIVE GAME**

11:00 AM-2:00 PM

*Perform Studio*

The Krinkle is a game which enables cooperation between players and the audience. The goal is to defend your castle against a wave of funny, hungry creatures called Krinkles using magic spells. This project reveals the abilities of a large tracking area for collaborative tasks and entertainment.

### PROCESS

"The development of the Krinkle installation involved computer scientists and artists. We used the Unity 3D and the Cube. First we did a mapping of the space on the game to the real space in the cube. Then we integrated the user input to the player tracking system. To synchronize all the players we developed a networking system. Once the game was running we adjusted graphics and sound effects. Finally we balanced the difficulty and performed tests to make sure that the game was running smoothly."

Mahdi Nabiyouni, Computer Science, Center for Human Computer Interaction  
Wallace Lages, Computer Science, Center for Human Computer Interaction  
Leonardo Arantes, Illus Interactive Graphics



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## EXPERIENCE...

### **SPATIALIZATION OF SOUND**

11:00 AM-2:00 PM

*Perform Studio*

The creation of immersive audio using large-scale loudspeaker arrays is gaining momentum in the audio research and entertainment industries. Combined with immersive video vision systems and motion tracking systems, 3D sound fields are creating research environments with endless opportunities.

### PROCESS

"We are using the ASPIRE LAB, the Perform-Studio and the CUBE to explore different algorithms to create realistic 3D sound fields using large-scale loudspeaker arrays. The goal is to reproduce the real world in virtual reality environments as realistically as possible. To compare the different algorithms, we performed listener perception tests. Moreover, we designed a higher order sound field microphone to be able to record and decode higher order sound fields."

Alexander Kern, Mechanical Engineering, ICAT

Michael Roan, Mechanical Engineering, ICAT



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## INVENT...

### **WEARABLE ACTIVITY CLASSIFIER**

11:00 AM-4:00 PM

*Grand Lobby*

The wearable activity classifier consists of a suit with an embedded motion capture system linked to an activity classifier. This wearable system could be used for applications such as medical ambulatory monitoring or any other applications that require full-body activity recognition.

### PROCESS

“We built the suit with the embedded motion capture system based on wearability requirements. We then designed an activity classifier targeted specifically for wearable use. We integrated the classifier with the motion capture system on the suit, and tested the whole system with added physiological monitor in a medical ambulatory monitoring application.”

Rabih Younes, Electrical and Computer Engineering, ICAT

Jacob Dennis, Electrical and Computer Engineering

Madison Blake, Electrical and Computer Engineering

Mary Lee Carter, Industrial Design

Thomas L. Martin, Electrical and Computer Engineering, ICAT





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### TRANSDISCIPLINARY CHOREOGRAPHIC PROJECTS

11:00 AM-4:00 PM

*Grand Lobby*

Students in Billie Lepczyk's choreography class at Virginia Tech were required to create multimedia dances that express issues that concern them. Their choreographic statements include themes of body image, religion, perseverance, soldiers' goodbye, and a senior's Virginia Tech experience. /

### PROCESS

"Student choreography was captured by two or more digital video cameras. Some videotaping was site-specific. The choreography was edited with the Adobe Premier Pro program and clips, images, sound, and text were incorporated to contribute to the students'™ statements in their digital storytelling."

Billie Lepczyk, Professor of Dance, Theatre and Cinema, School of Performing Arts; Institute for Creativity, Arts, and Technology Catalyst Fellow

Project 1: Jeffrey Dean Compton, Jr., Political Science

Project 2: Hannah Gray, Public Relations

Project 3: Sarah Parshley, Biochemistry

Project 4: Anthony Sham, Sociology

Project 5: Joshua McGuire, International Studies

Project 5: Robyn Schneider, International Studies

Project 6: Adrienne Focke, Human Development

Dillon Jackson, Public Relations

Erin Mattimiro, Marketing Management

Nan Yang, Human Nutrition, Foods & Exercise, Theatre



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## INVENT...

### TEACHING HANDS-ON LEARNING USING GREATER THAN GOODS LLC'S OMNIBOARD™

11:00 AM-4:00 PM

*Grand Lobby*

Greater Than Goods LLC is a start-up whose goal is to help teachers easily, quickly, and economically provide fun and effective hands-on lessons for students. The Omniboard™ is the company's new product that is a powerful tool in the hands of an educator looking for ways to employ hands-on learning.

#### PROCESS

"For over a year, Greater Than Goods LLC has been testing and developing the Omniboard™ and add-on lessons based on teacher and student feedback. Beginning in the Spring 2016 semester, four students in the Virginia Tech ICAT Start-Up class selected the Omniboard™ as their class project to determine its market feasibility."

Karla Hoffman Sharrer

Hunter Buyalos, Industrial & Systems Engineering, ICAT Startup class

Megan Eschman, Industrial & Systems Engineering, ICAT Startup class

Devin Fitts, Industrial & Systems Engineering, ICAT Startup class

Kayla Iverson, Human Nutrition, Foods, & Exercise, ICAT Startup class



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### **CAN INNOVATORS BE MADE?**

11:00 AM-4:00 PM

*Grand Lobby*

Can Innovators Be Made? is a workshop and the resulting dialogue surrounding the “how can we” and the “why” questions of training innovators. We are currently editing a volume that compiles this dialogue – between historians, science and technology studies scholars, and practitioners.

### PROCESS

“We planned an intimate conference for close to forty people in March 2015 at both the Virginia Tech Research Center-Arlington and the Smithsonian Institution's National Museum of American History. During this two-day event, in thematic sessions, we discussed pre-circulated papers by invited participants, with invited commentators. The written contributions have since been reviewed and revised. We are now working with individual authors to help them better articulate their voice and content.”

Marie Stettler Kleine, Science and Technology Studies

Matthew Wisnioski, Science and Technology Studies, ICAT

Eric Hintz, Smithsonian's Lemelson Center for the Study of Invention and Innovation



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## LEARN...

### **VISUALIZATION OF HISTORIC SITES FOR MEMORY, MEMORIALIZATION, AND HISTORICAL INQUIRY**

11:00 AM-4:00 PM

*Grand Lobby*

Addressing potential contexts in which this project could be used, student-learning variables designers should consider, a formative evaluation plan that will help the project team to collect data to keep on track, and a vision statement for what this project could look like in more complete form.

Trent Dawson, School of Education  
Sara Sweeney, School of Education  
Stephan Munz, School of Education



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## INVENT...

### PATHWAYS TO INNOVATION

11:00 AM-4:00 PM

*Grand Lobby*

Pathways to Innovation showcases diverse approaches to studying and practicing innovation at Virginia Tech, both in and out of the classroom. Visitors are encouraged to interact with and comment on games, activities, and student projects.

### PROCESS

"Most of our team is involved in putting together a Pathways Minor in Innovation, based around the three undergraduate courses – Innovation in Context, CREATE!, and The Startup Class – that are showcased in our exhibit. We have been meeting for over a year to work on the minor, and we brought our specific materials together in February and March to design a display for the library. For ICAT Day we have modified the library exhibit to make it more interactive and engaging."

Lisa McNair, Engineering Education

Liesl Baum, ICAT

Marc Junkunc, Apex Systems Center for Innovation and Entrepreneurship

Kari Zacharias, Science and Technology in Society

Scott Fralin, University Libraries



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## LEARN...

### **SMART FOSSILS: FOSSILS WITH EMBEDDED RFID TAGS**

11:00 AM-4:00 PM

*Grand Lobby*

The Smart Fossil is 3D printed from the scan of a fossil. During printing an RFID tag is embedded inside of the fossil and programmed with information as part of an interactive display. It explores the use of 3D printing to create models that could not be obtained without damaging the specimen.

#### PROCESS

"A CT scan was taken of the fossil of a phytosaur skull that was collected from West Texas, then the medical software Mimics was used to distinguish rock from bone from empty space and reconstruct the shape of the brain, inner ears, and other soft tissues that would have been part of this animal in life. This model was cleaned and modified in Netfabb and Blender to create a cavity for the RFID tag to be placed inside. During printing the RFID tag was embedded into the fossil and programmed."

Christopher Williams, Mechanical Engineering

Michelle Stocker, Geosciences

Sterling Nesbitt, Geosciences

Emily Lessner, Geosciences

Logan Sturm, Mechanical Engineering

Saish Tedia, Mechanical Engineering





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## PLAY...

### CREATIVE COMPUTING CAPSTONE PROJECTS

11:00 AM-4:00 PM

*Grand Lobby*

Students in the Creative Computing capstone studio present their “systems of resistance for imaginary worlds.” Tackling privacy, surveillance, machine morality, gesture interfaces, news bias, GPS spoofers, urban shelters and more!

### PROCESS

“Working in teams, the students first created imaginary worlds within which their systems would be encountered. They used interviews, surveys, and ethnographic methods to develop and refine their ideas. They developed a series of iterative paper and physical prototypes and created short movies introducing their work.”

Aisling Kelliher, Computer Science  
Daniel Amick, Computer Science  
Brittany Barnes, Computer Science  
Sam Blissard, Computer Science  
Jae Choi, Computer Science  
Jamie Dalrymple, Computer Science  
Karsten Dees, Art  
Jonathan Downs, Computer Science  
Matt Favero, Computer Science  
Latika Gulati, Computer Science  
Nicholas Hu, Computer Science  
Ben Jaques, Computer Science  
Brandon Jacobson, Computer Science  
Somn Kafley, Computer Science  
Pranavi Kotagiri, Computer Science  
Ethan Mattice, Computer Science

Peter Maurer, Computer Science  
Cody Mensavage, Computer Science  
Evan Merke, Art  
Dominic Napoleon, Computer Science  
Mark Olsen, Computer Science  
Alisher Pazyzbekov, Computer Science  
Julius Phu, Computer Science  
Ransom Roberson, Computer Science  
Sean Rowland, Computer Science  
Andrew Sanders, Computer Science  
Phillip Shin, Computer Science  
Sam Singh, Computer Science  
Marcus Stewart, Computer Science  
Omavi Walker, Computer Science  
Colton Walker, Computer Science  
Victoria Worrall, Computer Science



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### **OUR PANDEMIC: 1918**

11:00 AM-4:00 PM

*Grand Lobby*

Our Pandemic: 1918 is a point-and-click video game. Our intention is to give the player a historically accurate depiction of how the 1918 Flu Pandemic impacted living conditions in US cities through highly curated narratives and settings. Our exhibit is an interactive demo of the unfinished game.

### PROCESS

"We used archival and digital resources to create a historically accurate world for the game to take place in. Then we storyboarded our research findings to see how they'd fit into the world of Our Pandemic and the game play. Next we built the basic game mechanics in Unity and translated the storyboard materials into the game environment to complete the game demo."

Tom Ewing, History

Meredith Wilson, History

Michael Johnson, History

Brandon Hale, Music

Alex McLean, Music, Aerospace and Ocean Engineering

DJ Malinowski, Music

Robby Kurtz, English, Art and Art History, School of Visual Arts

Nick Bolin, Computer Science

Grayson Lewis, History

Allison Hurley, History

Keith Gilbertson, Library



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### HOME BASED INTERACTIVE NEUROREHABILITATION

11:00 AM-4:00 PM

*Grand Lobby*

Our interdisciplinary team is developing a lightweight, adaptive system for unsupervised stroke rehabilitation in the home. Using a Kinect camera, an iPad interface and customized 3D printed objects, the system tracks and assesses hand and body movement during rehabilitation exercises.

#### PROCESS

“Our research team bridges computer science, design, engineering, robotics, and healthcare. We use computer vision and machine learning to capture and assess patient movement. We use industrial, interactive, and environmental design strategies in creating an engaging and well crafted patient experience. We use novel manufacturing techniques in creating soft skin sensors for detecting hand pressure. We collaborate with doctors and physiotherapists in developing adaptive rehab activity protocols.”

Aisling Kelliher, Computer Science, ICAT

Thanassis Rikakis, Provost

Dhruv Batra, Electrical and Computer Engineering

Devi Parikh, Electrical and Computer Engineering

Jinwoo Choi, Electrical and Computer Engineering

Latika Gulati, Computer Science

Ed Coe, ICAT



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### **NASA WEARABLE TECHNOLOGY PROJECTS**

11:00 AM-4:00 PM

*Grand Lobby*

These are student projects in collaboration with NASA Johnson Space Center in the area of wearable technology and smart fabrics for space applications.

### PROCESS

“Personnel at NASA Johnson Space Center provided the students with brief descriptions of advanced concepts to explore. Students spent the semester working in teams with NASA personnel serving as mentors.”

Tom Martin, ICAT, Electrical and Computer Engineering

Paola Zellner, Architecture

Malik White, Architecture

Namitha Somasundaram, Electrical and Computer Engineering

Kevin Malhotra, Electrical and Computer Engineering

Brian Elliot, Electrical and Computer Engineering

Megan Kelly, Architecture

Monica Welcker, Architecture

Jarrett Volkoff, Architecture

Adam Yang, Mechanical Engineering



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### HOW DO YOU MATCH VIRTUAL FABRIC WITH REAL-WORLD FABRIC?

11:00 AM-4:00 PM

*Grand Lobby*

Have you ever done online clothing shopping and got unsure of the kind of fabric used? Have you ever wanted to simply feel the fabric? We have virtual fabrics to help give you a sense of the fabric, with commodity technology. Help improve our virtual fabrics by matching them to real-world fabrics!

#### PROCESS

"We obtained a series of diverse real-world fabrics from costume designers. Then, we started modeling those fabrics on Unity, a pervasive gaming engine. We also added a LeapMotion so that a user can move the fabric based on hand movements. We iterated with our costume designer on improving the models, and now, we ask participants to match the virtual with real-world fabrics."

Anamary Leal, Computer Science, Center for Human-Computer Interaction

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

Jane Stein, Theater, School of Performing Arts

Kurt Luther, Computer Science, Center for Human-Computer Interaction

Ben Knapp, ICAT

Josh Tanenbaum, University of California Irvine



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### **BRIDGE DECK CRACKING STRUCTURAL INVESTIGATION WITH HIGH-RESOLUTION IMAGE-BASED RECONSTRUCTION**

11:00 AM-4:00 PM

*Grand Lobby*

This project presents a novel approach towards automated infrastructure condition assessment and an experimental case study with a real structure. A 3D digital bridge deck model was generated using DSLR cameras, and computer vision algorithms were used to analyse the deck condition.

#### PROCESS

“3D image-based reconstruction and structure from motion techniques were implemented to reconstruct an as-built 3D digital state model of the US15 bridge deck using off-the-shelf cameras to assess its condition. This digital model can be used for structural assessment as well as for virtual and augmented reality applications.”

Abraham Lama Salomon, Civil and Environmental Engineering  
Cristopher Dennis Moen, Civil and Environmental Engineering





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### DESIGN FOR AMERICA AT VIRGINIA TECH

11:00 AM-4:00 PM

*Sandbox*

Design for America is an organization that focuses on human centered design. Each semester members join one of 5 or 6 projects that aims to identify problems in the community and work to fix them. We have projects looking at student health, prosthesis, STEM education, and more.

### PROCESS

"We take applications from students of all majors and create teams of 4-6 students. These teams follow our 6 step design process: identify the problem, immerse yourself in the issue, reframe the problem, ideate a solution, build a prototype, and test the solution. "

Simone Stewart, Mechanical Engineering, DFA

Joe Bruzek, Computer Science, DFA

Elizabeth Park, Industrial Design, DFA

Anna Mumma, Mechanical Engineering, DFA

Callie Gobes, Interior Design, DFA

Lan Le, Electrical Engineering, DFA

Zachariah Turner, General Engineering, DFA

Jason Lin, Electrical Engineering, DFA

Arianna Krinos, General Engineering, DFA



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## INVENT...

### **ACTIVT: MAKING HEALTH AND FITNESS AT VIRGINIA TECH EASY AND ACCESSIBLE**

11:00 AM-4:00 PM

*Sandbox*

ActiVT is a Health and Fitness project with Design For America. It consists of a mobile application that allows for easy access to VT Rec Sports events, clubs, and classes and a social networking effort to bring together all of Virginia Tech's students, clubs, and athletics.

#### PROCESS

"We conducted a large amount of research into what motivates people to be physically active and what ways we could help more people be active at Virginia Tech. The best ways we felt ActiVT could help were by allowing for easier access to what clubs, events, and activities were happening on campus and in the on Campus Gyms and to try and bring all of the groups related to physical activities together. The best avenue to accomplish these goals is to leverage both physical networks and software."

Alexander Burkey, Computer Science

Joshua Hull, Mechanical Engineering

Ethan Goldenberg, Electrical Engineering

Christine Junod, Industrial & Systems Engineering



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## INVENT...

### **YARD MAPPER**

11:00 AM-4:00 PM

*Sandbox*

There are over 2 million tractor trailers in the United States. Ever wonder how trucking companies keep track of their fleet? We have developed a wireless sensor system to not only track trailers but also reduce hefty fees associated with fleet management.

### PROCESS

"We first performed extensive customer discovery on pre-existing technologies understanding why and where competition is not meeting market needs. We then developed a hardware and software based solution and started working with a distribution center meeting their needs at an affordable level. Google Maps was integrated into our system providing real-time views of trailer locations. The solution was then implemented at this center where we further identified needs of its personnel. "

Patrick Acker, Sandbox

David Evans, Sandbox



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## INVENT...

### GOJOURNI TELEPORTATION IN VIRTUAL REALITY

11:00 AM-4:00 PM

*Sandbox*

GoJourni exists to show people it is possible to alter one's reality through impossible adventures. We provide a platform for viewing 360° videos and the controls to navigate between multiple videos in a choose-your-own-adventure storyline. The story is yours to twist and turn.

#### PROCESS

"We use 360° video cameras to capture the wonders of our world. We then cut and stitch the videos. We draw out a storyline and string the videos together to tell a compelling story. We have created controls for navigation between the videos allowing the user to transition seamlessly using virtual reality head-mounted displays."

Ari Goldberg, Industrial & Systems Engineering

Matei Canavra

Adeshola Oke-Bello



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## INVENT...

### SEEMORE TRANSPORTATION SYSTEM DESIGN

11:00 AM-4:00 PM

*Sandbox*

The SeeMore Transportation System Design was developed in order to make it possible for the SeeMore project to travel safely across the nation.

#### PROCESS

"In order to make the custom shipping containers, I had to measure each part of SeeMore repeatedly. I designed all the containers and carts in SketchUp, and used a CNC machine to cut out the cart faces. The rest of the containers and carts were constructed out of plywood, dimensional lumber, foam and OSB."

Alex Judson Froelich, School of Visual Arts

Sam Blanchard, School of Visual Arts



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## LEARN...

### PROJECTS FROM INTRODUCTION TO HUMAN-COMPUTER INTERACTION, SPRING 2016

11:00 AM-4:00 PM

*Sandbox*

Student teams in CS 3724 showcase cool, innovative and creative systems and show off their prototyping skills.

#### PROCESS

"We present videos from 18 student teams in the class. They researched, iterated through various ideas, and assessed prototype interfaces for particular user needs in museum visits, being a new time graduate student, and working behind the scenes at VT."

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

Emad Abdulrahman, Computer Science / Mikias Alemu, Computer Science / Riley Babcock, Computer Science / Nicholas Bolin, Computer Science / Adam Bousquet, Computer Science / Joshua Brandman, Mechanical Engineering / Jodie Burnett, Computer Science / Lauren Cahill, Computer Science / Walter Carlson, Computer Science / Zhizheng Chen, Computer Science / Kevin Cianfarini, Computer Science / Edward Cottiss, Mechanical Engineering / Sean Crenshaw, Computer Science / Alyssa Cunningham, Chemical Engineering / Irtiza Delwar, Computer Science / Precila Dessai, Computer Science / Sarah Devlin, Computer Science / Dakota Douglass, Computer Science / Andrew Eason, Computer Science / Oliver Ebeling-Koning, Mechanical Engineering / Carlos Gallegos, Computer Science / Hugh Gardiner, Computer Science / Erin Gaughan, Computer Science / Christie Goddard, Computer Science / Jack Guttman, Philosophy / Victoria Hairston, Computer Science / Jason Hall,



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Computer Science / Jodee Harris, Mechanical Engineering / Michael Harvey,  
Computer Science / Justin Hoelscher, Computer Science / Jue Hou, Computer  
Science / Cory Howard, Computer Science / Kevin Hyer, Business Information  
Tech / Daniel Im, Computer Science / Burhan Ishaq, Computer Science /  
Taiwen Jin, Computer Science / So Jo, Computer Science / Alan Kai, Computer  
Science / Danna Kim, Computer Science / Gene Kim, Literature and Language /  
Trevor Kinaman, Computer Science / Marina Kiseleva, Computer Science /  
Benjamin Kodres-O'Brien, Computer Science / Alexandra Lamontagne,  
Computer Science / Eric Leszczynski, Computer Science / Michael Liu,  
Management / Michael Maino, Business Information Tech / Melissa Masters,  
Industrial & Systems Engineering / Matthew McShea, Computer Science /  
Travis Nguyen, Computer Science / Se Park, Computer Science / Kyle Pinkham,  
Mechanical Engineering / Megan Rigsbee, Computer Science / William  
Robertson, Computer Science / Jeffrey Shih, Computer Science / Patrick Sihh,  
Computer Science / Andrew Snyder, Computer Science / Andrew Sorrels,  
Computer Science / Edmund Sparrow, Mechanical Engineering / Jacob Stenzel,  
Computer Science / Ryan Sullivan, Computer Science / Austin Sutton,  
Philosophy / Camden Thacker, Mechanical Engineering / Melanie Trammell,  
Computer Science / Megan Tucker, Psychology / Davey Turner, Computer  
Science / John Urban, Computer Science / Hanna Vess, Computer Science /  
Jordan White, Computer Science / Jazmine Zurita, Computer Science





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## LEARN...

### **CHEM+C: INTEGRATING COMPUTATIONAL THINKING AND CHEMISTRY IN CLASSROOMS**

11:00 AM-4:00 PM

*Sandbox*

CHEM+C engages K12 students in the exploration of both chemistry concepts and also the techniques of computer programming. Through manipulating computational models of chemistry concepts, they have the opportunity to deepen scientific knowledge while also practicing computational thinking.

#### PROCESS

“Through collaboration amongst Virginia Tech-based chemists, computer scientists, and educators as well as University of Texas Austin-based science educators, we developed an agent-based computational model in NetLogo representing the cycle of water synthesis and decomposition. This topic presents concepts to students that, according to science education literature, are often difficult for students to understand. The team also developed a curriculum to accompany the introduction and exploration of this model in classrooms.”

Deborah Tatar, Computer Science  
Aakash Gautam, Computer Science  
Whitney Bortz, Computer Science  
Christina Orsino, Chemistry



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## GROW...

### WHO'S STIRRIN' IT UP IN HINTERLAND APPALACHIA?

11:00 AM-4:00 PM

*Orchestra Lobby*

Who is "stirrin' it up" out in your community in hinterland Appalachia? The Hinterland Coalition wants to know! Who is making social, entrepreneurial, inventive, or other change? Tell us the story + meet folks stirrin' it up + draw/write/describe your vision for a new Appalachia hinterland.

### PROCESS

"We are an incubating coalition of 50 hinterland Appalachia counties forming to devise new vision, new direction, and support of changemakers, social entrepreneurs, and coordinated public health plus economic research approach to this oft-ignored sub-section of Appalachia. Born out of research and liberally taking from other models, we are becoming a force on many fronts and will launch fully in 2017. Join us and shape the next direction for this region!"

Crystal Cook Marshall, Science and Technology in Society  
Ellen Darden, Social Work, Concord University

[www.hinterlandcoalition.org](http://www.hinterlandcoalition.org)



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## GROW...

### **SEXUAL ASSAULT PREVENTION QR (SAPQR)**

11:00 AM-4:00 PM

*Orchestra Lobby*

SapQR is an interactive media campaign to spread awareness about consent and prevention of sexual assault. It brings together research and technology to create an interactive experience using smartphones, QR scanners and carefully selected media to inform and educate on these topics.

### PROCESS

"We used the data and research conducted by the team from the Department of Communications to conceptualize the idea of having an interactive campaign. We developed a system which uses specially generated QR codes to send users to specific websites created by the team from the Department of Computer Science. The websites were each created individually using several web development platforms and hosted on a server set up by the team. The content for each site was carefully selected by the team."

James D. Ivory, Communication  
Scott McCrickard, Computer Science  
Nadia Dosky-McQuade, Communication  
Lindsey Flowers, Communication  
Kate Monick, Communication  
Madison Lanier, Communication  
Sara Lepley, Communication  
Luciano Biondi, Computer Science  
Chris Lai, Computer Science  
Nick Miller, Computer Science  
Erik Yeomans, Computer Science



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## GROW...

### **A MOBILE AUGMENTED REALITY APPLICATION FOR SEXUAL ASSAULT PREVENTION TRAINING**

11:00 AM-4:00 PM

*Orchestra Lobby*

As universities, on-campus organizations, and other groups become more active in establishing training about sexual assault prevention and consent, we are working on tools that trained moderators can use to harness media technologies in training to prevent sexual assault and educate about consent.

#### PROCESS

“An interdisciplinary team of students studied information about sexual assault prevention, public perceptions of information about sexual assault, consent, and information campaigns, and developed an application prototype for an augmented reality application for use in moderated training for sexual assault prevention. The application prototype can also be adapted for use in other information and training campaigns.”

Luciano Biondi Gonzalez, Computer Science

Nadia Dosky-McQuade, Communication

Lindsey Flowers, Communication

Akshay Goel, Computer Science

Christopher Lai, Computer Science

Madison Lanier, Communication, Political Science

Sara Lepley, Communication

Kate Monick, Communication

Erik Yeomans, Computer Science Scott McCrickard, Computer Science

James D. Ivory, Communication



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## GROW...

### **IMPACT QUOTIENT TECHNOLOGIES**

11:00 AM-4:00 PM

*Orchestra Lobby*

Impact Quotient Technologies (EQT) is a Catalyst faculty and student project exploring the relationship between empathy and immersive 360 video/audio. EQT seeks to inspire awareness, emotional intelligence, and empathy around social issues. Above all, EQT wants to make viewers feel something.

### PROCESS

“Conceived at an ICAT Catalyst retreat on January 29th, EQT has grown to collect all of the resources and people needed to create impactful immersive 360 videos. EQT is also a project in the 4094 Managing and Commercializing Technology class. In this class we explore EQT as an entrepreneurial opportunity. This exploration includes business modeling and identifying external funding for this project. ”

Allie Howe, Computer Science, ICAT Catalyst Program

Kalila Simpson, Computer Science

Sara Hernandez, Mechanical Engineering, Communication

Marc Junkunc, Management

Manisha Sharma, Sociology, Women's Studies

James D. Ivory, Communication

Aaron Atkins, Communication



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## GROW...

### **WATCHDOG**

11:00 AM-4:00 PM

*Orchestra Lobby*

An Android wearable application designed to help veterans with PTSD, WatchDog helps you develop mindfulness and awareness through heart rate monitoring and various relaxation techniques.

### PROCESS

"By pairing the Moto 360 smart watch with an Android phone, we can access and sync heart rate data across the devices. When there are consistent spikes indicating increased stress, the watch vibrates and asks the user to take a break. From here breathing techniques or mini games are launched on the phone. Geo-location data from the watch and user metrics are graphed and visualized on the phone app, and may be exported for practitioner and user's analysis."

Alexa Zalopany Casey, Salem Veteran's Administration

Scott McCrickard, Computer Science

Darius Vallejo, Computer Science

Emily Croeber, Computer Science

Seth Nute, Computer Science

Qiuchan Wang, Computer Science



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## GROW...

### **MAPPING THE FOURTH OF JULY IN THE AMERICAN CIVIL WAR ERA: A CROWDSOURCED DIGITAL ARCHIVE**

11:00 AM-4:00 PM

*Orchestra Lobby*

Mapping the Fourth project explores Americans' typically unspoken beliefs about national identity from newspapers, speeches, personal diaries and letters during the American Civil War when Americans were forced to confront difficult questions about the meaning and the boundaries of the nation.

#### PROCESS

"We collected related documents from diverse sources and digitized them if necessary. We used Omeka to host digitized historical documents and built Incite, a plugin to Omeka, with various web technology (e.g. HTML, CSS, Javascript, MySQL, PHP, etc) to crowdsource text analytics. The crowd (currently various school teachers and students) helped transcribe the documents, identify different types of entities and connect documents with various related subjects that historians use for their research."

Paul Quigley, History  
David Hicks, Education  
Kurt Luther, Computer Science  
Nai-Ching Wang, Computer Science  
Kevin Caprice, History  
Daniel Newcomb, Education

Steve Tatum, University Libraries  
Edwin Brooks, University Libraries  
Andi Ogier, University Libraries  
Amit Dayal, Computer Science  
Seth Nute, Computer Science





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## GROW...

### **CROWDSOURCED SENSEMAKING FROM IMAGES**

11:00 AM-4:00 PM

*Orchestra Lobby*

Quest is a software that harnesses the wisdom of crowds and orchestrates the crowds to geolocate an image. The crowds are supported by techniques of image retrieval, computer vision and machine learning. The software can geolocate any arbitrary image obtained from sources like Twitter & Flickr.

#### PROCESS

"The process is divided into three stages. In stage one, the crowdworker analyses an image and identifies clues in the image. In stage two, the worker has access to our large reference database of images and a Google map. The worker can perform investigations using these resources and certain other tools we provide. In the final stage, the worker draws conclusions from her investigation. Techniques in computer vision, image retrieval, and machine learning are used."

Kurt Luther, Computer Science  
Sneha Mehta, Computer Science  
Rachel Kohler, Computer Science



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## GROW...

### SUPPORT CROWDSOURCED SENSEMAKING IN BIG DATA WITH CONTEXT SLICES

11:00 AM-4:00 PM

*Orchestra Lobby*

Context Slice explores how we can make sense of large amount of complex text data with the help of many ordinary untrained individuals (crowd workers), and get insights as good as those by the intelligence analysts.

#### PROCESS

"We built a web app to let people create connections between named entities from the documents, specify from which documents the connections are made, how obvious this connections is, and describe how the two entities are connected. On the left is the document panel and on the right is the graphical visualisation of the named entities and connections."

Kurt Luther, Computer Science

Chris North, Computer Science

Tianyi Li, Computer Science



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## GROW...

### **VTARTWORKS: AN ONLINE COMMUNICATIONS HUB AND KNOWLEDGE BUILDING REPOSITORY FOR THE FIELD OF COMMUNITY CULTURAL DEVELOPMENT (CCD)**

11:00 AM-4:00 PM

*Orchestra Lobby*

VArtWorks aims to create an online platform that integrates two important synergistic activities, dialogue and knowledge exchange, to encourage communication and documentation among artists and non-artists, collaborators and allies, individuals, organizations, and institutions engaged in CCD.

#### PROCESS

"This iterative project will deliver a sequence of near-term, intermediate, and final outcomes: First, a viable prototype/proof of concept on which to build the site to scale; Second, a beta version of the site and soft launch to a core group of representative users to provide ongoing feedback for iterative development; Third, a full-scale launch of the site and launch to the general public; Fourth, a release of our software free and open source for others to use. "

Andi Ogier, University Libraries

Bob Leonard, School of Performing Arts

Kurt Luther, Computer Science

Devon Johnson, University Libraries

Zoey Ryu, University Libraries

Kristin Kelly, School of Performing Arts



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## INVENT...

### EARLY CHILDHOOD FABLAB - FURNITURE DESIGN COMPETITION

11:00 AM-4:00 PM

*Orchestra Lobby*

In the design of Early Childhood Fab Labs, it is not enough to just have small chairs; the furniture must promote engagement, interaction, and movement while also enabling focus and concentration. Students will showcase their design solutions of furniture for ECE FabLab environments.

#### PROCESS

"The competition and design brief were sent out the broader student and faculty population. I held two informational meetings back in February to present the brief, answer questions, and allow those interested to speak with the lead of the FabLab project. I have been available throughout the semester to perform design critiques, make connections with early childhood learning centers to allow for research, and to answer additional questions. Designs presented at ICAT Day will mostly be a surprise."

Liesl Baum, ICAT



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## LEARN...

### **BOYS & GIRLS CLUB OF SOUTHWEST VIRGINIA SATELLITE LAPTOP ORCHESTRA**

11:00 AM-4:00 PM

*Orchestra Lobby*

Boys & Girls Club Satellite Laptop Orchestra project allows fourth and fifth grade children to explore STEM concepts through music and technology. From ideation to production, this unique journey empowers participants to design their own digital instruments, compose for them, and perform as an ensemble.

#### PROCESS

"A semester-long weekly program focused on teaching kids how to code their own instrument, develop ways of interaction using Nintendo Wiimotes, refine it, and compose for it. As part of the ICAT Day, students will present their composition and performance skills by presenting their instruments and the newfound ensemble."

Ivica Ico Bukvic, School of Performing Arts, ICAT

Jeremy Ernst, Education

Kyriakos Tsoukalas, Human-Centered Design

Daniel Clark, School of Performing Arts

Lisa Moyer, Education

Michelle Klopfer, Education

Anita Deck, Education



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## LEARN...

### **IMMERSIVE SEAD EDUCATION: NORTH CROSS LOWER SCHOOL SEAD EXPERIENCE**

11:00 AM-4:00 PM

*Mezzanine Lobby*

Take a walk through the North Cross Lower School SEAD Experience, designed to stimulate cross-grade, multidisciplinary content exploration. This exhibit will provide an immersive look at student experiences and program outcomes through use of 360° video, audio, and student artifacts.

#### PROCESS

"ICAT and the Virginia Tech Center for the Arts collaborated with North Cross faculty to design an 8-day experience to engage lower school students in an exploration of literature, performance, communication, and design. Based on our Instrument Maker Camp model, students engaged in a series of workshops and merged grade levels to build knowledge, construct meaning, and design an illustration of their perspectives. They honed ideas through the critical response process and created an exhibit open to parents and the community."

Liesl Baum, ICAT

Holly Lesko, ICAT

Meggin Hicklin, Center for the Arts

Jon Catherwood-Ginn, Center for the Arts

Phyllis Newbill, ICAT



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## EXPERIENCE...

### **360° SEAD EXPERIENCE**

11:00 AM-4:00 PM

*Mezzanine Lobby*

As part of the North Cross Lower School SEAD experience Computer Science capstone students explored collecting 360° videos of student workshops as a way to immerse the audience and enhance the research conducted through the experience. Videos are complemented by student reflections and artifacts.

### PROCESS

"Our team recorded 360° video and spatial audio during workshops using a 7-GoPro video rig and 4 audio recorders. We recorded over two days at the North Cross School. This video was stitched using Kolor Autopano Video Pro. Audio was then mapped to the 360-degree space using Unity, and then exported for use with an Oculus Rift. Our accompanying web application, deployed using Amazon Web Services, can be viewed on iPads to give users a more detailed look at the workshop outcomes."

Sean Goodrich, Computer Science  
Benjamin Kodres-O'Brien, Computer Science  
Zachary Stefan, Computer Science





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## LEARN...

### **PROBLEM SOLVING THROUGH PROGRAMMING AND PLAY**

11:00 AM-4:00 PM

*Learning Studio (253)*

This presentation demonstrates methods for teaching 5- to 7-year-old children problem solving using the Scratch Jr. programming language in both physical and virtual environments.

#### PROCESS

"We developed this curriculum as our final project for the EDIT 5164 Design for Learning course. Using Dick, Carey, and Carey's Instructional Systems Design method, we analyzed learners and learning contexts, developed instructional strategies, and created formative evaluations. We developed our instructional tools using the Scratch Jr. program for iPad and organized our materials using Google Drive and Wix."

Daima Alotaibi, Instructional Design and Technology

Andrew Hopun, Instructional Design and Technology

Brooke Marton, Instructional Design and Technology

Sara Sweeney, Instructional Design and Technology, Higher Education and Student Affairs



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## PLAY...

### **INTERACTIVE GAME FOR GROUP COLLABORATION AND LEARNING**

11:00 AM-4:00 PM

*Learning Studio (253)*

C-OLiVE stands for Collaborative Orchestrated Learning in Virtual Environments and is a multi-user simulation game that involves a whole classrooms in learning about the production of olive oil. C-OLiVE can be played by a group of 3 to 24 students, using a combination of Xbox controllers and iPads.

#### PROCESS

"C-OLiVE evolved after three iterations of the system, initially supporting 1-3 players. The game was developed using the Virtual Reality (VR) toolkit Vizard, a Python-based framework for building VR experiences. The virtual factory was created using 3D Studio Max, and is a high-fidelity replica of an actual olive oil production factory in Greece. All machinery (e.g., pumps, presses, engine, mills) were high-polygon models and we used Maya to optimize or recreate them for real-time reproduction."

Panagiotis Apostolellis, Computer Science/Center for Human-Computer Interaction

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

Reza Tasooji, School of Visual Arts

Dane Webster, School of Visual Arts



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## LEARN...

### ENHANCING SOCIAL COMPETENCE THROUGH AUDIO-BASED TECHNOLOGY FOR CHILDREN WITH AUTISM

11:00 AM-4:00 PM

*Learning Studio (253)*

Our project aims to develop and test an auditory feedback and signaling system to reduce negative emotional arousal automatically by adjusting emotionally-valenced musical output to children with Autism Spectrum Disorder (ASD), to help them maintain well-regulated emotions and social behavior. Come, explore the future.

#### PROCESS

"This is the early prototype phase of this project, where we're still in ideation-implementation stage. It involves large amount of data collection from typically-developing children and children with ASD, followed by technical discussions/implementation of various intelligent algorithms. Psychologists, computer engineers, and musicians are major contributors to this project. Machine learning and wearable computing technologies are essential for this project until now, with the possibility of future additions."

Angela Scarpa, Psychology

Isabel Bradburn, Psychology

Martha Ann Bell, Psychology

Brennon Bortz, Computer Science, ICAT

Deanna Swain, Psychology

Deba Saha, Electrical and Computer Engineering, ICAT

Charles Nichols, Music, ICAT

Benjamin Knapp, Computer Science, ICAT



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## INVENT...

### CONSTRUCTING THE PARAMETRIC ENVELOPE

11:00 AM-4:00 PM

*Learning Studio (253)*

This research proposal challenges the perception of parametric design in architecture by bringing a physicality to the systems that shape form. Instead of remaining on the two-dimensional surface of a piece of paper in drawing or diagram, can these systems take on a physical form of their own?

#### PROCESS

"We looked at the role of the gestalt in architecture, which is a series of parts implying a whole beyond themselves. Once the broader design decisions were made, a parametric system was constructed in Grasshopper which optimized the arrangement of the parts to achieve a specific goal. Then a physical model was designed which represents the parametric envelope that holds the parts together using the laser cutter and 3D printer."

Forrest Bibeau, Architecture

Bobby Smyth, Engineering

Aki Ishida, Architecture, Advising Professor



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## LEARN...

### **ACADEMIC AUGMENTED REALITY, K-8**

11:00 AM-4:00 PM

*Learning Studio (253)*

The Academic Augmented Reality K-8 is an interactive and innovative exhibit that demonstrates the utility of augmented reality to engage and differentiate concepts for students in classrooms around the world.

#### PROCESS

"I used the software and App named Aurasma to create interactive digital media. I will then use a tablet to allow students scan pictures of concepts to see their learning and curiosity come to life."

Louis Rossi, Education, Curriculum, & Instruction, I-STEM Education



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## LEARN...

### **A HANDS-ON JOURNEY IN THE GEOSCIENCES**

11:00 AM-4:00 PM

*Learning Studio (253)*

The Department of Geosciences Modeling & Educational Demonstrations Laboratory (MEDL) will take you on a hands-on journey through the geosciences. Discover earthquakes, Earth's magnetism, and mountain building. Virtually manipulate how water flows on Earth's landscape using an augmented reality Sandbox.

#### PROCESS

"The Geosciences MEDL is where integrated science (aka geoscience), education research, and maker space come together to produce hands-on physical analog models for science education. We use common, everyday materials when ever possible so others can reproduce the same models on their own. The projects we are presenting are made with a variety of building materials, sensors, and open source virtual reality software to optimize the learner's analogical experience. "

Gary Glesener, Geosciences

Philip Prince, Geosciences



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## INVENT...

### **MIRROR WORLDS**

11:00 AM-4:00 PM

*Observation Room (251)*

The Mirror Worlds project is a research infrastructure that explores the relationship between physical and virtual environment interactions.

### PROCESS

"We use cameras and computer vision algorithms to track and extract people as blob data. This blob data is then transmitted and processed by our server, which then distributes this information to our screens that use Unity. So people walking in physical space are shown in the virtual space as well, and they can interact with people online via other sensors like Kinect and LEAP motion."

Benjamin Knapp, ICAT

Nicholas Polys, ICAT

Jackie Meese, ICAT

Nuo Ma, Electrical and Computer Engineering

Sachin Vasant Bharambe, Electrical and Computer Engineering

Anirudh Bagde, Computer Science

Nathaniel Lahn, Computer Science

Eric Williamson, Computer Science

Mykayla Fernandes, Architecture





# ICAT DAY

MONDAY, MAY 2, 2016 | MOSS ARTS CENTER

IF YOU... EXPERIENCE, PLAY, LEARN, GROW, INVENT

## LEARN...

### **INVESTIGATING PRESENCE IN MIRROR WORLDS**

11:00 AM-4:00 PM

*Observation Room (251)*

The aim of this project is to provide the Learning Sciences “lens” on ICAT's Mirror World project. We are exploring the educational value and affordances of such an environment as they apply to the current state of the project, as well as possible future developments and scenarios.

#### PROCESS

“We engaged with the ICAT Mirror World project team to learn what they have done so far and their current vision for the future of the Mirror World environment, which blends physical and virtual spaces and represents physically-present users in the digital environment. Based upon that, we sought to uncover the instructional affordances of such an environment in relation to the concept of presence. How can presence inform/affect collaborations and instructional activities in the Mirror World?”

Daron Williams, Instructional Design & Technology, Technology- enhanced Learning and Online Strategies

Aakash Gautam, Computer Science

Kelly Robinson, Agricultural, Leadership, and Community Education



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## PLAY...

### **MIRRORCRAFT**

11:00 AM-4:00 PM

*Observation Room (251)*

MIRRORcraft is an interactive exhibit that allows the user to see his or her mirror image in the version of a Minecraft avatar. A Kinect will allow the avatar to mirror the user's body and facial movements. There will be multiple screens displaying alternate views of the production.

### PROCESS

"We combined the existing OPERAcraft system with Kinect and PD-I2ork. OPERAcraft allows us to manipulate the Minecraft world, and therefore gives us the power to mimic user movement via Minecraft avatars. We converted the spatial coordinates obtained from two Microsoft Kinects (one for body and the second for the face) and extrapolated the relative angles between joints. Using this data we control the Minecraft movement. "

Ico Bukvic, School of Performing Arts, Digital Interactive Sound and Intermedia Studio, ICAT

Lynn Abbott, Electrical and Computer Engineering

Siddharth Narayanan, Electrical and Computer Engineering



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## EXPERIENCE...

### **PULSE 16**

11:00 AM-4:00 PM

*Sandbox projection*

Pulse 16 captured the heart and rhythm in Blacksburg's 16 blocks during the iconic two-day music and arts festival, Rock The Blocks. Using five live feeds from auteurs, we captured dynamic footage, streamed over wifi and displayed via architectural projection mapping on the Armory Gallery exterior.

### PROCESS

"My team used cutting edge wifi enabled SD cards and custom built camera rigs to send live captured footage from the six venues participating in Rock the Blocks Music and Arts festival over the 16 blocks of Blacksburg's Downtown. Three streams were run through a visually stunning and proprietary software build where we could control the visual effects and placement of the feeds on the Armory Gallery using a Christie DHD800 8k lumen projector."

George Hardebeck, Creative Technologies, ICAT

Yvonne Yee, Rock The Blocks

Tanner Uptegrove, Theatre, Spatial Audio, ICAT

Chris Risch, Convolution Films

Mary Desmond, Communications

Mordecai Lecky, Theatre and Cinema

Sarah Mezzy, Theatre and Cinema

Zach Cortez, School of Visual Arts



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## EXPERIENCE...

### **EXTRAORDINARY INTERRUPTIONS: A DANCE JOURNEY**

3:00 PM-4:00 PM

*Cube*

Based on choreographer Celeste Miller's personal/historical exercises, this devised multimedia performance probes dancers' visceral responses to six major news events from Y2K to the Flint water crisis.

#### PROCESS

"Each member of the dance ensemble selected a major news event that they recalled from the last 15 years. They free-wrote their responses to the event, devised a series of gestures from that writing, and then added edited text from the writing as spoken word to that gesture sequence. We complicated the performance by asking the dancers to perform in matched pairings, incorporate actual news copy, and interact with architecture. We added audio and video from the depicted events as a final layer."

Kristin Rose Kelly, Theatre Arts, ICAT

Thomas Murray, Theatre Arts

Ann Kilkelly, Theatre Arts, ICAT



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## EXPERIENCE...

### **A CHIP ON HER SHOULDER: A DOCUMENTARY PLAY ABOUT WOMEN IN ENGINEERING**

3:00 PM-4:00 PM

*Cube*

A docu-musical investigating the experience of women in the field of engineering featuring verbatim interviews with turns of music and dance. The creative team will share performance clips, interview recordings, and music instruments made out of Engineer tools.

#### PROCESS

"I interviewed and recorded 19 men and women in the field of Engineering. Then I transcribed those interviews and composed a verbatim script. I directed the show with actors who used not only the script but the recorded interviews to master the voice patterns of each speaker. I worked with a props designer to create Engineering musical instruments like a wrench xylophone. The play combined music, dance, and the interviews to tell a story about the current climate of Engineering."

Kristin Rose Kelly, School of Performing Arts, ICAT

Lauren Chilton, School of Performing Arts

Daveisha Gibson, School of Performing Arts

George Ligon, School of Performing Arts

Dylan Bombgardner, School of Performing Arts



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## EXPERIENCE...

### THE GALILEO PROJECT

3:00 PM-4:00 PM

*Perform Studio*

The Galileo Project is an experimental performance piece devised from crowd sourced submission, seeking to explore multiple research points including devising work through the process of crowd sourcing, use of innovative technology in theatrical applications, spatial audio, and copyright.

### PROCESS

"We put forth a call for media in any format to our Graduate Seminar class. From the media submissions, we stitched together a narrative using threads common to all the media submissions, which resulted in a script. The script was recorded and remixed with the audio media submissions into a new composition, then spatialized in Cycling '74's Max to 24 loudspeakers. For the performance, a live actor interacts with the spatial narrator and composition, enhanced by theatrical lighting."

Tanner Upthegrove, School of Performing Arts, ICAT  
Willie Caldwell, School of Performing Arts, Center for the Arts  
Ryan McHugh, School of Performing Arts



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## EXPERIENCE...

### **NEW MUSIC BLACKSBURG**

6:00 PM-7:00 PM

*Grand Lobby*

A concert of new chamber music, written by students in the Composition program at Virginia Tech.

### PROCESS

"Students studied the technique and repertoire of acoustic instruments, and developed musical material within musical structures, to compose new chamber music."

Matthew Alvarez, Music

Ezra Clark, Music

Matt Johnson, Music

Trevor McMillan, Political Science

Michael Mills, Music

Charles Nichols, Music, ICAT

Ryan Vazquez, Applied Economic Management

Bradley Vorjohan, Mechanical Engineering



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## EXPERIENCE...

### **DISIS CONCERT**

7:30 PM-9:30 PM

*Cube*

Digital Interactive Sound and Intermedia Studio concert

As part of the ICAT Day, VT Institute for Creativity, Arts and Technology (ICAT) and School of Performing Arts' Digital Interactive Sound and Intermedia Studio (DISIS) presents a concert of interactive computer music and fixed media, featuring performances by guest bassoonist Steve Vacchi, computer musician Adam Wirdzek, faculty horn player Wallace Easter, and the Linux Laptop Orchestra (L2Ork). The concert also features pieces by faculty composers Ivica Ico Bukvic, Eric Lyon, and Charles Nichols, and student composers Galina Belolipetski, Ben Epperly, Michael Rhoads, Jacob Stenzel, and Tanner Upthegrove, and collaborations with faculty choral director Dwight Bigler and the Virginia Tech Chamber Singers, Engineering faculty Mike Roan, and Cinema student Micah Untiedt. "Digital iD" offers an exploration of synergies among music, technology, arts, gesture, collaboration, interactivity, and ultimately community. The event is free and open to the public.





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### MOSS ARTS CENTER PROJECTION MAPPING PROJECT

8:30 PM-10:00 PM

*Grand Staircase*

By utilizing projected light and imagery, and complemented by sound, guests visiting the Moss Arts Center will experience a study in aesthetic design that showcases the unique architecture of the Building.

### PROCESS

"In 2016, the Moss Arts Center Projection Mapping Project took place in the interior stairwell inside the Moss Arts Center over a long weekend. The unique upside down staircase geometry above the stairwell was the projection surface. One Christie Projector was placed on an 18-foot scaffold at an upward angle and the projection was bounced off a large mirror. The other Christie projector was set below to cover the ceiling above the stairwell. Specialized lenses were used to go into the Christie projectors to cast light onto the ceiling surface at the best angle using previously scanned Lidar data. The animated light show was looped at 10 minute intervals. Tanner Upthegrove composed a sound track that was used for the piece and temporary speakers were set up inside and outside the facility so viewers could see and hear the piece from several vantage points. The ICAT Day presentation is the second iteration of the project."

Thomas Tucker, School of Visual Arts  
DongSoo Choi, School of Visual Arts  
Tanner Upthegrove, ICAT  
George Hardebeck, School of Visual Arts  
Jingyi Liang, School of Visual Arts

Fang Liu, School of Visual Arts  
Douglas Witney, Center for the Arts  
Kevin Ayoub, Center for the Arts  
Special thanks to Ben Knapp (ICAT) and Ruth Waalkes (Center for the Arts) for their support.

## **Institute for Creativity, Arts and Technology**

Benjamin Knapp,  
Director  
Tom Martin,  
Associate Director  
Liesl Baum,  
Research Assistant Professor  
Zach Duer,  
Immersive Environment Specialist  
Lisa Jansen,  
Grant Specialist  
Phyllis Newbill,  
Associate for Outreach and Engagement  
Tanner Upthegrove,  
Media Engineer  
Holly Williams,  
Program and Business Operations Manager  
Melissa Wyers,  
Administrative Assistant

## **Moss Arts Center**

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  
Meggin Hicklin,  
Exhibitions Program Manager

Development  
Lois Badey,  
Senior Director of Development  
Jessica Clough,  
Assistant Director of Development  
Brittany Guill May,  
Development Assistant

Finance and Administration  
Liz Scharman,  
Director of Administration  
Kevin Ayoub,  
Facilities Manager  
Toni Cartee,  
Fiscal and Human Resources specialist  
Steve Cox,  
IT Specialist  
Joyce Smith,  
Administrative assistant  
Kelly Stanley,  
Administrative Services Manager

Outreach  
David Ehrlich,  
Outreach Fellow for the Fine Arts

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  
Shana Buzzard,  
Marketing and Special Events Coordinator  
Carly DuPont,  
House Manager  
Avery Eliades,  
Digital Content Specialist  
Kacy McAllister,  
Box Office Manager

Production  
Doug Witney,  
Director of Production  
Gustavo Araoz,  
Lighting Supervisor  
Robert Gainer,  
Audio Supervisor  
Laine Goerner,  
Production Coordinator  
Ryan Hasler,  
Stage and Rigging Supervisor

Special thanks to Sara Sweeney, Kari Zacharias, Justin Lau, Krista Terry, Christopher Williams, and Camden Chatham for their help making ICAT Day a reality.