JOSH URBAN DAVIS

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RESEARCH INTERESTS

I study how to make computation more playful, creative, and accessible by prototyping novel hardware and software systems, then deploying user studies to evaluate their usability. My thesis work explored 4 prototype systems that support people with disabilities to engage in making through electronic hardware prototyping and creative computation. Recently, I've been examining how AI and telepresence can be used to elevate and expand user experience.

Some recent interests of mine include:
Generative Imaging and Design • Human-AI Interactions • Accessibility • Creativity Support Tools • Virtual/ Augmented/ Mixed/ Extended Reality • Novel Sensor Design

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A note on publication venues: in my primary area of research, Human Computer Interaction, the ACM Conference on Human Factors in Computing Systems (CHI) is considered one of the best forums for dissemination research results and covers the broad spectrum of research in Human Computer Interaction. Papers in these conferences are refereed as full papers and have an acceptance rate of around 15-25% each year.

PEER-REVIEWED PROCEEDINGS

C1. **Josh Urban Davis**, Paul Asente, Xing-Dong Yang. "Multimodal Direct Manipulation in Video Conferencing: Challenges and Opportunities". Proceedings of Designing Interactive Systems (**DIS**'23). Pittsburg, Pennsylvania. 2023. [Acceptance Rate: 24.6%]

C2. Makayla Lewis, Miriam Sturdee, **Josh Urban Davis**, Mafalda Gamboa, Sarah Fdili Alaoui, Claire Elisabeth Ohlenschlager, William Gaver, Eli Blevis, Lian Loke. "Is it art, is it HCI? Exploring the tensions between practice and research". Proceedings of Human Factors in Computing (**CHI**'23). Hamburg, Germany. 2023 [Acceptance Rate: 25.2%]

C3. Makayla Lewis, Miriam Sturdee, Thuong Hoang, John Miers, **Josh Urban Davis.** "Exploring AltNarrative in HCI Imagery and Comics". Proceedings of Human Factors in Computing (**CHI**'22). New Orleans, LA. 2022 [Acceptance Rate: 24.8%]

C4. **Josh Urban Davis**, Fraser Anderson, Merten Stroetzel, Tovi Grossman, George Fitzmaurice. "Designing Co-Creative Artificial Intelligence for Virtual Environments". Proceedings of the ACM International Conference on Creativity and Cognition (**C&C** '21) [Acceptance Rate: 23.1%]

C5. Miriam Sturdee, Makayla Lewis, Angelika Strohmayer , Katta Spiel, Nantia Koulidou, Sarah Fdili Alaoui, **Josh Urban Davis**. The Art in HCI: Human Creative Interactions. Proceedings of the ACM International Conference on Creativity and Cognition (**C&C** '21) [Acceptance Rate: 23.1%] [Best Paper: Top 1%] 🏆

C6. Kelly Mack, Maitraye Das, Dhruv Jain, Danielle Bragg, John Tang, Andrew Begel, Erin Beneteau, **Josh Urban Davis**, Abraham Glasser, Joon Sung Park, Venkatesh Potluri. Mixed abilities and varied experiences: a group auto-ethnography of a virtual summer

internship. Proceedings of Computing and Accessibility (**ASSETS** '21) [Acceptance Rate: 23.20%] [Best Paper: Top 5%] 🏆

C7. **Josh Urban Davis,** Johann Wentzel. "Font Your Friends and Loved Ones: In Defense of Ugly Interfaces". Proceedings of Human Factors in Computing (**CHI**'21). Yokohama, Japan. 2021. [Acceptance Rate: 23.8%]

C8. **Josh Urban Davis**, John Tang, Edward Cutrell, Teddy Seyed. PokerFace Mask: Exploring Augmenting Masks through an Interactive, Mixed-Reality Prototype. Proceedings of HICSS'22.

C9. **Josh Urban Davis**, Te-Yen Wu, Bo Shi, Hanyi Lu, Athina Panotopoulou, Emily Whiting, Xing-Dong Yang. "TangibleCircuits: An Interactive 3D Printed Circuit Education Tool for People with Visual Impairments". Proceedings of Human Factors in Computing (**CHI**'20). Honolulu, Hawaii. 2020. [Acceptance Rate: 24.31%] [Best Paper: Top 5%] [Neukom Institute Award for Outstanding Graduate Research] 🏆

C10. **Josh Urban Davis**, Jun Gong, Yunxin Sun, Parmit Chilana, Xing-Dong Yang. "CircuitStyle: A System for Peripherally Reinforcing Best Practices in Hardware Computing". Proceedings of User Interfaces Software Technology (**UIST**'19) New Orleans, LA. 2019. [Acceptance Rate: 20.6%]

C11. **Josh Urban Davis**. "IllumiWear: A Bendable Interactive Fiber-Optic eTextile for Audio and Visual Interactions." Proceedings of New Interfaces in Musical Expression (**NIME**'19). Porto Alegre, Brazil. 2019. [Acceptance Rate: 31%]

C12. Jun Gong, Xin Yang, Teddy Sayed, **Josh Urban Davis**, Xing-Dong Yang. "Indutivo: Contact-Based Object-Driven Interactions with Inductive Sensing." Proceedings of User Interface Software Technology (**UIST**'18), Berlin, Germany. 2018. [Acceptance Rate: 21%]

C13. **Josh Urban Davis**. "Postcards from the Electric Void: Interactive Generation of Animations, Images, and Sound Using Adversarial Learning". Second Workshop on Machine Learning for Creativity and Design, Neuro Information Systems Processing (**NeruIPS**'18). Montreal, QC. 2018. [Acceptance Rate: 21%]

C14. **Josh Urban Davis**. "The Gender Generator: Towards a Brain-Computer Interface for Evocation of Gender Dysphoria Symptoms." Proceedings of the 8th Annual Workshop on Creative Applications of Brain-Computer Interfacing, Human Factors in Computing (**CHI**'18). Montreal, QC. 2018. [Acceptance Rate: 27%]

PATENTS

P1. Calliope: A System for Supporting Human-AI Collaboration in Virtual Environments. Josh Urban Davis, Fraser Anderson, George Fitzmaurice. (Pending)

P2. Circuit Style: A System for Peripherally Reinforcing Best Practices in Hardware Computing. Josh Urban Davis, Jun Gong, Parmit Chilana, Xing-Dong Yang (No. 62/916,977)

RESEARCH EXPERIENCE

Adobe Research, Research Intern
GILL Lab
Mentor: Paul Asente
June 2021 – August 2022

- Prototyped a gesture and speech driven mixed-reality interface using Javascript, HTML/CSS, MediaPipe, and OpenCV

- Studied the habits of presenters in virtual telepresence environments through formative studies
- Developed a programming-by-demonstration authoring environment for mixed-reality
- Presented talks on evolving personal research projects to lab meetings and reading groups
- Evaluated prototype in study and reported results intended to be submitted for publication

Microsoft Research, Research Intern
Future Wearables Lab, RiSE Group, and Ability Team
Mentor: John Tang, Teddy Seyed, Edward Cutrell,
June 2020 – September 2020

- Deployed studies examining the accessibility of wearables and personal protective equipment masks for people with special needs
- Submitted findings from accessibility study for publication at ACM SIGACCESS
- Prototyped an interactive mask which uses a commodity smartphone to enable live translation, captions, and expressivity
- Evaluated prototype in study and reported results intended to be submitted for publication to Human Factors in Computing (CHI)
- Facilitated partnerships between the research team and commercial interests in order to patent and develop prototype into product

Autodesk Research, User Interface Research Intern
HCI and Graphics Research Group
Mentor: Fraser Anderson, Tovi Grossman, George Fitzmaurice
January 2020 – May 2020

- Collaborated with the Machine Learning, Graphics, and Generative Design research teams to develop techniques for generating 3D objects using GANs, Transformers, and Autoencoders
- Designed interfaces for virtual reality which facilitated fluid human-ai interaction
- Developed and evaluated novel interaction methods intended in publication (User Interface Software Technology UIST)
- Prototyped and deployed interactive generative design systems using generative adversarial networks for virtual reality

XDiscovery Lab, Dartmouth College, Graduate Student Researcher
Mentor: Xing-Dong Yang
March 2018 - Present

- Prototyped post-touch screen devices and novel sensing techniques
- Developed and evaluated novel interaction methods resulting in publication (Human Factors in Computing CHI and User Interface Software Technology UIST)
- Collaborated with Kelley Center for the blind to implement enabling technologies for visually disabled users.

Bregmann Media Labs, Media Arts and Sciences Researcher
Mentor: Michael Casey, Grace Leslie
February 2017 – February 2018

- Analyzed fMRI data for signal reconstruction of auditory stimuli

- Developed novel brain-computer interaction methods for creating paintings and music
- Led experiment team in collection of EEG and user experience data
- Presented and demonstrated brain-computer interaction techniques at multiple venues (Human Factors in Computing CHI and New Interfaces for Musical Expression NIME)

DALI Lab, Developer II
August 2016 – February 2017

- Led team of designers and developers to create virtual reality and biofeedback systems
- Collaborated with NASA and the Space Medicine Laboratory at Geisel Medical School to create virtual reality content for space flights
- Prototyped biofeedback systems for virtual reality to provide assistive health and well-being
- Developed and edited 360 video and 3D modeled VR environments with Unity and Adobe Creative Suite

MANUSCRIPTS IN PREPARATION

M1. Josh Urban Davis, Paul Asente "CLIO: Using Multi-Modal Direct Manipulation to Blend Performer and Media Realities".

M2. Josh Urban Davis, Hongwei Wang, Parmit Chilana, Xing-Dong Yang"it's not an issue of malice, but of ignorance":: Designing Inclusive Video Conferencing for Presenter who are d/Deaf or Hard of Hearing.

M3. Josh Urban Davis, Farshid Salemi Parizi, John Tang, Edward Cutrell, Teddy Seyed Make It Or Break It: Design and Accessibility Considerations when Making during a Crisis.

M4. Josh Urban Davis, Yizhe Zu, Xing-Dong Yang. "PantoTouch: Enabling Precision Gestural Input on Smart Watches Using a Pantograph"

M5. Jun Gong, Teddy Sayed, Josh Urban Davis, Songlin Xu, Yao Zou, Yuke Wang, Xin Lui, Da-Yuan Huang, Xing-Dong Yang. " SpringBoard: A Haptic Feedback System for Breadboards Using Virtual Springs."

AWARDS

A1. Gary Marsden Grant for Early Career Researchers 2023

A2. Best Paper Award Creativity and Cognition (C&C'21)

A3. Best Paper Nomination Accessibility and Computing (ASSETS'21)

A4. Neukom Institute Award for Outstanding Graduate Research 2020

A5. Best Paper Honorable Mention Human Factors in Computing (**CHI'**20)

A6. Neukom Institute Grant 2019

A7. Dartmouth Graduate Student Fellowship

INVITED TALKS

- UC Berkeley BiD Seminar, University of California Berkeley. "Multimodal Systems to Support Accessible and Flexible Creativity" (Berkeley, CA 2023)

- CU Boulder ATLAS Seminar, University of Colorado Boulder "Accessible and Flexible Creativity" (Virtual 2023)
- Stanford HAI Seminar, Stanford University. "Towards Omni-Modality" (Palo Alto, CA 2023)
- MIT HCI Engineering Group, Massachusetts Institute of Technology (Cambridge, MA) "Systems for Democratizing Creativity" (Virtual 2022)
- Art and Computation Reading Group, Adobe Research, (San Francisco, CA) "A Brief History of Generative Art and Design" (Virtual 2021)
- Center for Accessibility and Inclusion Research (CAIR), iSchool of the Golisano College of Computing and Information Sciences at RIT, (Rochester, NY) "Accessible Creativity: Wearables, Generative Design, and Inclusive Human-AI Co-Creation" (Virtual 2021)
- HCI Reading Group, Adobe Research, (San Jose, CA) "Making on Your Feet, Semi-extemporaneous Presentations in Mixed-Reality"
- Harvard Graduate School of Design, Harvard University, (Cambridge, MA) "Accessible Creativity: Wearables, Generative Design, and Inclusive Human-AI Co-Creation" (Virtual '20)
- Summer HCI Talks, Microsoft Research, (Redmond, WA) "Exploring the Accessibility of Personal Protective Equipment (PPE), Wearables, and Beyond" (Virtual) 2020
- Taste of Science Houston, (Houston, TX) "Sonnets and Science, A Brief History and Future of Computational Poetry" (Virtual) 2020
- Ability Team, Microsoft Research, (Redmond, WA) "Project PokerFace: Designing an Interactive Mixed-Reality Mask" (Virtual) 2020
- RiSE Group, Microsoft Research, (Redmond, WA) "Make It or Break It: Design Considerations When Making During a Crisis" (Virtual) 2020
- MIT Computer Science and Artificial Intelligence Laboratory, (Boton, MA) Fabrication at CHI, "Tangible Circuits: An Interactive 3D Printed Circuit Education Tool for People with Visual Impairments" (Virtual) 2020
- Thayer School of Engineering (Hanover, NH) "Creating Tools for Accessible STEAM Education" (Virtual) 2020
- Autodesk Research (Toronto, ON) "Creative Support Tools in Virtual Environments with Generative Design" 2020

SERVICE and VOLUNTEERING

- CHI' 23 Papers Reviewed: 2
- DIS' 22 Papers Reviewed: 2
- C&C' 21 Pictorials Chair
- C&C' Papers Reviewed: 8
- CHI' 22 Papers Reviewed: 2
- IEEE VR' 22 Papers Reviewed: 1
  - Total Papers Reviewed 2022: **13**
- MobileHCI 2021 Late Breaking Work Chair
- MobileHCI 2021 Papers Reviewed: 8
- DIS' 21 Papers Reviewed: 2
- CHI' 21 Late Breaking Work Chair
- CHI' 21 Papers Reviewed: 6
- TEI' 21 Papers Reviewed: 1
  - Total Papers Reviewed 2021: **17**
- UIST' 20 Papers Reviewed: 2

- DIS' 20 Papers Reviewed: 1
- CHI' 20 Papers Reviews: 2
  - Total Papers Reviewed 2020: **5**

EDUCATION AND TRAINING

Dartmouth College, Hanover, NH. 2018-Present
Ph.D in Computer Science
Department of Computer Science Human Computer Interaction Lab
Advisors: Prof. Xing-Dong Yang

Dartmouth College, Hanover, NH. 2016-2018
M.S. in Computer Science and Digital Arts
Bregman Media Labs and Department of Computer Science
Advisors: Prof. Michael Casey, Prof. Xing-Dong Yang, Prof. Grace Leslie

BIO

+ pronouns: any pronoun is fine +

Josh Urban Davis is an american research-based artist and engineer from Texas whose practice incorporates sculpture, performance, writing, sound, and video. His research interests span a wide spectrum of topics in human-computer interaction (HCI), with a specific emphasis on generative design, novel creativity support tools, and inclusive technologies. Davis' recent creative projects explore the relationship between emerging technologies, social relationships, and identity. His work has been exhibited at D!iverseWorks, the Blaffer Art Museum, Chandler Center for the Arts, Art League Houston, and was featured in collaboration with the New School as part of the Venice Architecture Biennale in 2021. He currently lives in Oakland, CA with his cat, Nocturne, where he is pursuing a PhD in computer sciences at Dartmouth.

CREATIVE WORK

EXHIBITIONS AND PERFORMANCES

+ 2022
+ SellOuts. Syzygy 2022. San Francisco, CA 2022

+ 2021
+ RipTides of the Mind. Biennale Architettura 2021. Supported by a grant from the New School. Venice, Italy. 2022
+ Hideouts. Creativity and Cognition Gallery 2021. Venice, Italy 2022

+ 2020
+ The Night Air COVID poetry project, Virtual. Supported by a grant from Houston Arts Alliance and Art League Houston. 2020

+ 2019
+ An Archive of Feeling, Chandler Gallery, Randolph,VT. 2019
+ New Century/New Materials, Heritage Gallery at Alternatives, Whitinsville, MA. 2019

+ IllumiWear: Concert for Fabric and Light, NIME, Puerto Alegre, Brazil. 2019
+ Science and Sonnets: Creative Turing Test, Pint of Science, Houston, TX. 2019
+ Lion's Den, BETA Theatre and DinoLion Productions, (Creative Technologist Collaborator) Houston, TX. 2019

+ 2018
+ Stabat Mater: For Voice and Electronics, SHIFT Festival, (Electronics and Visuals Collaborator) Hanover, NH. 2018
+ Postcards from the Electric Void, Artificial Intelligence and Art, Montreal, QC. 2018

+ 2017
+ Synapstraction, Digital Arts Expo, Black Visual Arts Center, Hanover, NH. 2017
+Mixtape, Hardy and Nance Studios, Houston, TX. 2017

+ 2016
RedHoust, BETA Theatre and DinoLion Productions, (Script Writing Collaborator) Houston, TX. 2016

+ 2015
+ Drawing the Perfect Line, Box 13 Artspace, Lonestar Explosion Performance Art Biennale. Houston, TX. (Curated by Julia Wallace and Jonatan Lopez). 2015.
+The Big Machine, El Rincoln Sociale. Houston, TX 2015

+ 2014
+Submission, Silver Street Studios. Houston, TX. 2014

+ 2012
+Cohesion, Gallery M Squared, Houston TX. 2012
+A Taste of Red Ink, G Gallery, Houston TX. 2012

+ 2011
+The Big Show, Lawndale Contemporary Arts Center, Houston, TX. Runner-up: Best in Show (Juror: Larissa Harris, Curator, Queens Museum of Art, New York, NY) 2011
+State Fair, DiverseWorks Alternative Art Space, Houston, TX. 2011
(Juror: Diane Barber, Executive Director, DiverseWorks Alternative Art Space, Houston, TX)
+Luck of the Draw, DiverseWorks Alternative Art Space, Houston TX. 2011
+East Austin Studio Tour, Home for Misfit Ideas, Austin, TX. 2011
(Juror: Lizzie Pelz, Curator, Home for Misfit Ideas, Austin, TX)
+Ekphrastic: Dionesia, University of Houston Honors College, Houston TX. 2011

REFERENCES

Prof. Xing-Dong Yang
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Dr. Fraser Anderson
HCI and Visualization Research Group
Autodesk Research, Toronto
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Prof. Michael Casey
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Prof. Grace Leslie
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Director, Digital Arts Program
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