

# Katherine J. Mimnaugh

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## Education

Master of Science - May 2018

University of Illinois at Urbana-Champaign - USA

- Department of Natural Resources and Environmental Sciences
- Thesis: Investigating How Mindfulness Promotes the Restorative Effects of Natural Environments in Virtual Reality

Bachelor of Science - May 2008

University of Illinois at Urbana-Champaign – USA

- Major: Psychology
- Second Major: Spanish
- Study Abroad: Granada, Spain; Fall 2007

## Language Skills

- English (Native)
- Spanish (Level B1)
- Finnish (Level A1)

## Current Position

Doctoral Student - Jan 2019 to Present

University of Oulu – Finland

- Degree Program: Computer Science and Engineering
- Researcher in the Perception Engineering Group in the Center for Ubiquitous Computing

## Previous Experience

Researcher - Sept 2018 to Dec 2018

Tilburg University – Netherlands

- Department of Cognitive Science and Artificial Intelligence
- Researcher on Project VIBE, creating and evaluating a virtual human for medical training applications
- Investigated human facial expressions development for a virtual avatar and created ERB application

Fellow – Jun 2018 to Dec 2018

Launch Pad

Oculus - USA

- Accepted into competitive program to support diverse developers of virtual reality content
- Attended two-day boot camp in Menlo Park for networking and VR developer training
- Collaborated on two virtual reality projects (360 film and social VR experience) for the program
- Attended virtual trainings and completed weekly blog posts on product development progress

Fellow – May 2018 to Jul 2018

iVenture Student Startup Accelerator

University of Illinois at Urbana-Champaign – USA

- Head of Production for YouMatter Studios, a student startup creating VR empathy films
- Conducted customer discovery surveys and learned about small business ecosystems
- Interviewed potential clients and businesses to explore product-market fit
- Completed NSF innovation corps training for startup companies

Graduate Teaching Assistant - Jan 2018 to May 2018

CS 498 VR – Virtual Reality Course

Department of Computer Science, University of Illinois at Urbana-Champaign – USA

- Created VR empathy film for class project on homelessness; supervised class project on VR relaxation app
- Trained 200 students in virtual reality development class and assisted with homework in Unity 3D
- Coordinated 4 projects filming 360-degree virtual reality videos and assisted with cinematography
- Oversaw coordination of class project sponsorship with 5 university faculty and staff collaborators
- Delivered guest lecture on the vestibular system, vection and designing comfortable UI for VR applications

Research Program Coordinator and Graduate Research Assistant - Dec 2012 to May 2018

Cognition and Brain Laboratory

University of Illinois at Urbana-Champaign – USA

- As lab manager, ran over 100 experiments; trained 15 lab members on brain signal recording techniques
- Conducted over 50 neuropsychological testing sessions with adults of all ages to assess cognitive function
- Recruited and trained 10 undergrad lab assistants; coordinated work for 13 graduate students and postdocs
- Collected data for reports, ordered lab equipment and wrote official documents for grants and the ERB
- Coordinated standardization of lab techniques and oversaw maintenance and organization of lab files

Graduate Research Assistant – Aug 2016 to Jul 2017

Virtual Reality & Nature Laboratory

University of Illinois at Urbana-Champaign – USA

- Designed and carried out investigation on the stress buffering effects of nature exposure in virtual reality
- Wrote and secured Institutional Review Board approval and grant funding for the project
- Selected, tested and deployed psychophysiological, virtual reality, audio and video equipment
- Recruited and trained 4 undergrad lab assistants; coordinated schedules for subject running
- Developed and piloted experimental procedure; recruited, scheduled and ran 43 research sessions

Research Program Coordinator – Jun 2008 to Dec 2012

Cognitive & Affective Neuroscience of Psychopathology Laboratory

University of Illinois at Urbana-Champaign – USA

- As lab manager, recruited over 2,500 study participants and scheduled multiple sessions for each subject
- Organized calendars for 10-15 lab members each semester to staff experiments and schedule meetings
- Conducted an average of 10 lab tours, EEG and MRI experiments per week; ran 155 selected subjects
- Trained 17 students on experimental procedures and 5 students on EEG data processing
- Organized 102 GB worth of research data in databases with careful maintenance of confidential records
- Assisted in writing and editing academic papers and wrote official documents for grants and the IRB

## Undergraduate Research Assistant – Jan 2007 to May 2007

Human Performance and Perception Laboratory

University of Illinois at Urbana-Champaign – USA

- Collected cheek swabs, extracted DNA and performed PCR on genetic samples
- Received training on proper handling of biohazard waste and administration of neuropsychological tests
- Recruited participants, arranged parking, handled payments and ran two-hour experiments for 30 subjects

## **Research Funding and Grants**

### The Center on Health, Aging, and Disability Pilot Grant

2016-2017, \$20,000 USD

- Principal Investigators: Matthew Browning and Steven M. LaValle
- Title: The Technology of Healing: Exploring Simulated Natural Environments in Virtual Reality for Therapeutic Applications
- Role: Assisted in writing and securing grant funding for thesis research project

### Additional Experience

- Grant data compilation and writing assistance for: Cognitive & Affective Neuroscience of Psychopathology Lab (principal investigators Wendy Heller and Greg Miller), Cognition and Brain Laboratory (principal investigator Kara Federmeier), the Virtual Reality & Nature Laboratory (principal investigator Matthew Browning), and the Perception Engineering Group (principal investigator Steven M. LaValle)

## **Research Output**

### Publications

- Pouke, M., **Mimnaugh, K. J.**, Chambers, A. P., Ojala, T., & LaValle, S. (2021). The plausibility paradox for resized users in virtual environments. *Frontiers in Virtual Reality*, 2, 1-20. Citations: 0
- Becerra, I., Suomalainen, M., Lozano, E., **Mimnaugh, K. J.**, Murrieta-Cid, R., & LaValle, S. (2020). Human perception-optimized planning for comfortable VR-based telepresence. 2020 Robotics and Automation Letters (RA-L). Citations: 1
- Letkiewicz, A. M., Silton, R. L., **Mimnaugh, K. J.**, Miller, G.A., Heller, W., & Sass, S. (2020). Childhood abuse history and attention bias in adults. *Psychophysiology*, 1-21. Citations: 0
- Browning, M., **Mimnaugh, K. J.**, van Riper, C., Laurent, H., & LaValle, S. (2020). Can simulated nature support health? Comparing short, single-doses of 360-degree nature videos in virtual reality with the outdoors. *Frontiers in Psychology – Environmental Psychology*. Citations: 36
- Ryskin, R., Ng, S., **Mimnaugh, K. J.**, Brown-Schmidt, S., & Federmeier, K. (2019). Talker-specific predictions during language processing. *Language, Cognition and Neuroscience*, 1-16. Citations: 5
- Sass, S.M., Heller, W., Fisher, J.E., Silton, R.L., Stewart, J.L., Crocker, L.D., **Mimnaugh, K. J.**, & Miller, G.A. (2014). Electrophysiological evidence of the time course of attentional bias in non-patients reporting symptoms of depression with and without co-occurring anxiety. *Frontiers in Psychology*, 5, 301. Citations: 27
- Letkiewicz, A. M., Miller, G. A., Crocker, L. D., Warren, S. L., Infantolino, Z. P., **Mimnaugh, K. J.**, & Heller, W. (2014). Executive function deficits in daily life prospectively predict increases in depressive symptoms. *Cognitive Therapy and Research*, 38(6), 612-620. Citations: 48

## Conference Presentations and Posters

- **Mimnaugh, K. J.**, Suomalainen, M., Becerra, I., Lozano, E., Murrieta-Cid, R., & LaValle, S. (2021, September). *Analysis of user preferences for robot motions in immersive telepresence*. Paper submitted to the 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems, Prague, Czech Republic.
- **Mimnaugh, K. J.**, Suomalainen, M., Becerra, I., Lozano, E., Murrieta-Cid, R., & LaValle, S. (2021, March). *Defining preferred and natural robot motions in immersive telepresence from a first-person perspective*. Paper presented at the 2021 International Workshop on Virtual, Augmented, and Mixed-Reality for Human-Robot Interactions (VAM-HRI), Boulder, CO (conference held online due to COVID-19), 303.
- Becerra, I., Suomalainen, M., Lozano, E., **Mimnaugh, K. J.**, Murrieta-Cid, R., & LaValle, S. (2020, October). *Human perception-optimized planning for comfortable VR-based telepresence*. Paper presented at the 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems, Las Vegas, NV (conference held online due to COVID-19).
- Pouke, M., **Mimnaugh, K. J.**, Ojala, T., & LaValle, S. (2020, March). *The plausibility paradox for scaled-down users in virtual environments*. Paper presented at IEEE VR 2020 - 27th IEEE Conference on Virtual Reality and 3D User Interfaces, Atlanta, GA (conference held online due to COVID-19).
- **Mimnaugh, K. J.**, van Riper, C. & Browning, M. (2018, June). *Mindfulness as a mechanism for restoration from nature: A study of the effects of natural environments and virtual reality on psychological responses to stress*. Poster presented at the International Symposium on Society and Resource Management, Salt Lake City, UT.
- Browning, M., & **Mimnaugh, K. J.** (2017, June). *Can virtual reality be used to mimic the health benefits of nature and systematically test environmental psychology theory?* Poster presented at the Environmental Design Research Association conference, Madison, WI.
- **Mimnaugh, K. J.** & Browning, M. (2017, April). *Do we need 'actual' park visitation for Park Rx? Studying nature-based virtual reality for stress-reduction*. Poster presented at the George Wright Society conference, Virginia Beach, VA.
- Taff, D., Van Riper, C., Browning, M., **Mimnaugh, K. J.**, Thomsen, J., Newman, P., Hipp, A., Brownlee, M., Koontz, L., and Richardson, L. (2017, April). *Health parks healthy people: State of the evidence and paths to improve the science*. Panel presented at the George Wright Society conference, Virginia Beach, VA.
- Ryskin, R., Ng, S., **Mimnaugh, K. J.**, Brown-Schmidt, S., & Federmeier, K. D. (2017, March). *Speaker-specific predictions about membership during language comprehension*. Poster presented at the annual meeting of the Cognitive Neuroscience Society, San Francisco, CA.
- Browning, M., & **Mimnaugh, K. J.** (2017, March). *Preliminary results from simulating nature, enhancing health project: An exploration of the therapeutic applications of natural environments in virtual reality*. Poster presented at Chittenden Symposium on Assistive Technologies in Health, Champaign, IL
- Browning, M. & **Mimnaugh, K. J.** (2016, October). *Technology of healing: Exploring simulated natural environments for therapeutic applications*. Poster presented at the North American Association for Environmental Education Conference, Madison, WI.
- **Mimnaugh, K. J.** & Browning, M. (2016, June). *The technology of healing: Exploring simulated natural environments in virtual reality for therapeutic applications*. Poster presented at the International Symposium on Society and Resource Management, Houghton, MI.
- Browning, M & **Mimnaugh, K. J.** (2016, April). *Simulating nature, enhancing health: Exploring therapeutic applications of natural environments in virtual reality, and opportunities for the Design Center*. Poster presented at the Chittenden Symposium, Champaign, IL.
- Browning, M., Browning, L., Chalip, L., van Riper, C., Stewart, W., & **Mimnaugh, K. J.** (2016, April). *Simulating nature, enhancing health: Virtual reality proposal for the Design Center*. Poster presented at the University of Illinois Design Center Lightning Symposium, Champaign, IL.
- Letkiewicz, A. M., Sifton, R. L., **Mimnaugh, K. J.**, Heller, W., Miller, G. A., & Sass, S. M. (2015, September). *Child abuse and altered processing of negative stimuli in adulthood*. Poster presented at the annual meeting of the Society for Psychophysiological Research, Seattle, WA.

- Finy, M. S., Hojnicky, M. P., Crocker, L. D., Warren, S. L., O'Hare, A. J., **Mimnaugh, K. J.**, Smolen, A., Miller, G. A., & Heller, W. (2014, March). *Anxious arousal as a joint function of inhibitory dysfunction and the dopamine D4 receptor gene (DRD4) polymorphism*. Poster presented at the International Workshop on Statistical Genetic Methods for Human Complex Traits, Boulder, CO.
- Finy, M. S., Hojnicky, M. P., Crocker, L. D., Warren, S. L., O'Hare, A. J., **Mimnaugh, K. J.**, Miller, G. A., & Heller, W. (2013, September). *Anxious arousal as a joint function of inhibitory dysfunction and the dopamine D4 receptor gene (DRD4) polymorphism*. Poster presented at the annual meeting of the Society for Research in Psychopathology, Oakland, CA.
- Letkiewicz, A. M., Heller, W., Crocker, L. D., **Mimnaugh, K. J.**, Warren, S. L., Spielberg, J. M., & Miller, G. A. (2013, September). *Rumination mediates a relationship between executive dysfunction and increases in depressive symptoms over time*. Poster presented at the annual meeting of the Society for Research in Psychopathology, Oakland, CA.
- Murdock, C. D., Crocker, L. D., Warren, S. L., **Mimnaugh, K. J.**, Miller, G. A., & Heller, W. (2013, May). *Executive function deficit in unipolar depression: The important role of emotional control*. Poster presented at the 25th Annual Convention of the Association for Psychological Science, Washington, D.C.
- Tengshe, C., Heller, W., Hur, J., O'Hare, A. J., Crocker, L. D., Warren, S. L., Spielberg, J. M., **Mimnaugh, K. J.**, Bredemeier, K., & Miller, G. A. (2013, September). *Relationships among anxiety types, rumination and depression*. Poster submitted for presentation at the 27th annual meeting of the Society for Research in Psychopathology, Oakland, CA.

## Research Supervision and Leadership

### Co-supervision of Student Projects

- Eetu Laukka, master's thesis, "Comparing Hand Tracking and Controller-Based Interactions for a Virtual Reality Learning Application," University of Oulu – April 2021
- Oona Kivelä, master's thesis, "Exploring the Potential of VR Games as Exercise," University of Oulu – July 2020
- Joona Halkola and Juho Kalliokoski, bachelor's thesis, "Effectiveness of a Wii Balance Board as a Locomotion Control Method for a Virtual Reality Telepresence Robot," University of Oulu – July 2020
- Elmeri Uotila, Sakaria Pouke, and Jari Jussila, bachelor's project, "Distinguishing Vertigo from VR Sickness," University of Oulu – June 2020
- Sami Varanka, Tuomas Koivuaho, and Valtteri Erkkilä, bachelor's project, "Perceptual Training," University of Oulu – June 2020
- Jouni Lammi, Aleksi Sierilä, Petteri Moilanen, bachelor's thesis, "Scale Perception in Virtual Reality," University of Oulu – April 2019

### Training on Research Methods, Data Analysis, and Responsible Laboratory Conduct

- 22 undergraduate and graduate assistants for the Cognitive & Affective Neuroscience of Psychopathology Lab
- 15 undergraduate, graduate and postdoc assistants for the Cognition and Brain Laboratory
- 4 undergraduate assistants for the Virtual Reality & Nature Laboratory

## Teaching Merits

### Invited Lectures and Short Courses

- "Opportunities to Support Mental Health with Virtual Reality Nature Videos" – 10<sup>th</sup> Jun 2020, Invited speaker for Women Tech Global Conference 2020 (conference held online due to COVID-19)
- "Human Perception I: Physiology" and "Human Perception II: Cognition and Experience" – 28<sup>th</sup> Aug 2019, Short course for the Joensuu Summer Course on Optics, University of Eastern Finland, Joensuu, Finland

- “*Vestibular System, Neurophysiology of VR Sickness and Human Subjects Research*” – 23<sup>rd</sup> Apr 2019, Guest lecture for the VR Systems and Humans course, University of Oulu, Oulu, Finland

### Virtual Reality Systems and Humans Course TA – Oct 2020 to Dec 2020

- As teaching assistant, graded papers, ran lab sessions, and assisted students with assignments
- Delivered guest lecture:
  - “*Vestibular System, Neuroscience of VR Sickness, & Human Subjects Research*” 19<sup>th</sup> Nov 2020
  - Lecture available online at: <https://youtu.be/tz4qx31x2zY>

### Computer Science Course in Virtual Reality TA – Jan 2018 to May 2018

- As teaching assistant, prepared lecture content and class presentation slides
- Delivered two guest lectures:
  - “*Human Vestibular System, Vection, and Preventing VR Sickness*” 23<sup>rd</sup> Apr 2018
  - “*VR for Good: Virtual Reality for Beneficial Societal Applications*” 4<sup>th</sup> Dec 2017

## **Awards and Honors**

### Finnish Foundation for Technology Promotion Encouragement Grant – April 2021

Tekniikan Edistämissäätiö - Finland

- Awarded to postgraduate students in technology who aim for a doctorate in technology

### Google Europe Students with Disabilities Scholarship – May 2020

Google, Inc. – Ireland

- Awarded to students with disabilities in computer science that demonstrate academic merit, leadership and a passion for computer science

### Gamma Sigma Delta - Mar 2017

The Honor Society of Agriculture

University of Illinois at Urbana-Champaign – USA

- Awarded to graduate students who demonstrate outstanding ability, great potential for future leadership, and those with at least a 3.5/A=4.0 or better grade point average

### The Campaign Award - Aug 2014

Sierra Student Coalition

Sierra Club - USA

- Awarded for the creation and operation of a youth international campaign to the United Nations Conference of the Parties

### The Bridge-Building Award - Aug 2012

Sierra Student Coalition

Sierra Club - USA

- Awarded for collaborative work with the Champaign-Urbana community around campus fossil fuel divestment and other local environmental initiatives

## **Other Academic Merits**

### Invited International Lectures

- “*Augmented & Virtual Reality: Beyond Gaming*” – 8<sup>th</sup> Mar 2020, Invited panel for WECODE 2020, Harvard University, Cambridge, USA (conference held online due to COVID-19)

- “*El Cerebro y la Mente: An Introduction to Cognitive Neuroscience for HCI*” - 2<sup>nd</sup> Oct 2019, Invited lecture at the Centro de Investigación en Matemáticas, Guanajuato, Mexico
- “*Virtual Reality for Medical Applications*” - 14<sup>th</sup> Nov 2018, Guest lecture for the Virtual and Augmented Reality Course, Tilburg University, Tilburg, Netherlands

### Memberships

Institute of Electrical and Electronics Engineers, Student Member	Jan 2019 – Present
Association for Computing Machinery, Student Member	Jan 2019 – Present
International Association for Society and Natural Resources, Student Member	Jan 2016 – Dec 2017

### Book Contributions

- Pangilinan, E., Lukas, S., & Mohan, V. (2019). *Creating Augmented and Virtual Realities: Theory and Practice for Next-Generation Spatial Computing*. O'Reilly Media, Inc. (technical editor).

## **Service and Societal Impact**

Student Representative (halloped), Student Wellbeing Working Group Feb 2021 – Dec 2021

- Selected to represent students in the administration of the University of Oulu

Founder, UIUC VR for Good Club Jan 2018 – May 2018

- Created group focused on developing virtual reality for educational, scientific & societally beneficial uses
- Organized biweekly meetings to discuss relevant topics, opportunities for projects and potential collaborations

International Committee, Sierra Student Coalition Jan 2014 – Jan 2016

- Co-chair, International Committee - created campaign to international climate negotiations (Paris, Lima)

Campaigns and Trainings, Sierra Student Coalition Aug 2012 – Jan 2014

- Co-lead, Campaigns Committee - supported student environmental campaigns nationwide in USA

Prairie Rivers Network, Sierra Club & Heartland Coalfield Alliance Oct 2011 – Dec 2014

- As Student Liaison for the Sierra Club group, spearheaded collaboration between local activists and students

UIUC Beyond Coal Campaign, Students for Environmental Concerns Sept 2011 – Jan 2014

- Alumni Engagement Chair (Fall 2013), Outreach Chair (Fall 2012, Spring 2013), Coalition-Building Chair (Spring 2012), Phonebank and Databasing Leader (Fall 2011)