

# Robert K. Konrad

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## Education

**Stanford University**, PhD, Department of Electrical Engineering, Stanford, CA (2016-)

My research interests lie at the intersection of computational displays and human physiology with a specific focus on virtual and augmented reality systems.

**Stanford University**, MS, Department of Electrical Engineering, Stanford, CA (2014-2016)

GPA: 3.9/4.3

Specializations: Computational Imaging and Displays / Virtual and Augmented Reality

Relevant Coursework: Machine Learning, Deep Learning (NLP and Computer Vision), Convex Optimization, Computational Imaging and Display, Digital Image Processing, Information Theory, Visual Psychology, Cryptography, Geometric and Topological Data Analysis

**University of Toronto**, BAsC, Department of Electrical and Computer Eng., Ontario, Canada (2010-14)

GPA: 3.83/4.0

Minor: Robotics and Mechatronics

## Publications

**SpinVR: Towards Live-Streaming 3D Virtual Reality Video**, R. Konrad, D. Dansereau, A. Masood, G. Wetzstein. ACM Transactions on Graphics (SIGGRAPH Asia), 2017.

**Accommodation-invariant Computational Near-eye Displays**, R. Konrad, N. Padmanaban, K. Molner, E.A. Cooper, G. Wetzstein. ACM Transactions on Graphics (SIGGRAPH), 2017.

**Evaluation of Accommodation Response to Monovision for Virtual Reality**, N. Padmanaban, R. Konrad, G. Wetzstein. OSA Imaging and Applied Optics Congress, 2017.

**Optimizing Virtual Reality for all Users through Gaze-Contingent and Adaptive Focus Display**, N. Padmanaban, R. Konrad, T. Stramer, E.A. Cooper, G. Wetzstein. Proceedings of the National Academy of Sciences (PNAS), 2017.

**Novel Optical Configurations for Virtual Reality: Evaluating User Preference and Performance with Focus-tunable and Monovision Near-eye Displays**, R. Konrad, E.A. Cooper, G. Wetzstein. ACM SIGCHI, 2016.

**A GPU-Accelerated Physical Layer for Simulating Wireless Networks**, R. Konrad, B. Hamilton, B. Cheng. Spring Simulation Multi-Conference, 2014.

## Public Demonstrations

**AutoFocals: Evaluating Gaze-contingent Eyeglasses for Presbyopes**, R. Konrad, N. Padmanaban, G. Wetzstein. ACM SIGGRAPH Emerging Technologies, 2018.

**Computational Focus-Tunable Near-Eye Display**, R. Konrad, N. Padmanaban, E.A. Cooper, G. Wetzstein. ACM SIGGRAPH Emerging Technologies, 2016.

**Light Field and Focus-tunable Near-eye Displays**, R. Konrad, F. Huang, G. Wetzstein. IEEE Int. Conference on Computational Photography (ICCP), 2016.

## Talks

**Computational Near-Eye Displays with Focus Cues**, *SID Display Week Seminar*, 2018.

**Accommodation-invariant Computational Near-eye Displays**, *Nvidia GPU Technology Conference*, 2018.

**Virtual Reality That's Better Than the Real World**, *TEDx Beacon Street*, 2016.

## Industry Experience

**Consultant**, *Oculus Research*, Oct 2017 – Present

- As a consultant for the computational display team I work on developing and evaluating a novel display technology developed during the summer internship.

### **Research Scientist Intern, Oculus Research, June 2017 – Sept. 2017**

- As a member of the computational display team my research focused on designing, building, and evaluating a novel display technology where I developed the computational, electrical, optical systems, and software systems.

### **Consultant, Magic Leap, Sept 2016 – June 2017**

- As a consultant for the computational display team I worked on evaluating a novel display technology developed during the summer internship.

### **Research Scientist Intern, Magic Leap, June 2016 – Sept. 2016**

- As a member of the Advanced Photonics Group my research focused on designing a novel light field display prototype where I developed the computational, electrical, optical systems, and software systems.

### **Research Scientist Intern, Light Co, June 2015 – Sept. 2015**

- As a member of the the Computational Imaging team, I worked on various stages of the camera pipeline: demosaicing, post-processed synthetic blur, as well as creating a modular camera pipeline integrating the various efforts in the group
- The prototype is capable of, but not limited to the following display modes: adaptive-focus, gaze-contingent focus, monovision, and accommodation-invariant

### **Research Intern, MIT Lincoln Laboratory, June – Sept. 2013**

- Modeled the physical layer of the network stack on both the CPU and GPU to explore the gains of a parallel algorithm in the computation of path loss and interference powers in a multi-modal transmitter/receiver system
- Implemented serial portion (run on CPU) in C and parallel portion (run on NVIDIA GPU) in CUDA

## **Teaching Experience**

**Applications of Visual Perception to Virtual and Augmented Reality**, Instructor, *ACM SIGGRAPH course*, 2018

**Build Your Own VR Display: An Introduction To VR Display Systems For Hobbyists And Educators**, Instructor and Organizer, *Electronic Imaging course*, 2018

**Build Your Own VR Display: An Introduction To VR Display Systems For Hobbyists And Educators**, Instructor, *ACM SIGGRAPH course*, 2017

**EE267 "Virtual Reality"**, Head Teaching Assistant, *Stanford University*, 2016, 2017, 2018

- Helped design and instruct the first and second offerings of the EE267 "Virtual Reality" course
- The course is designed to give students a crash course on VR, in hands on manner.
- Students will learn about all hardware (optics, electronics, display, microcontroller, ...) and software (computer graphics, orientation tracking, position tracking, ...) aspects of Virtual Reality (VR).
- The goal for each student or small team of students is to build a fully functional head mounted display, including optics, display, IMU, rendering, lens distortion shader, model loader etc., from off-the-shelf parts. The HMD we will build is inspired by the Oculus DK1.

## **Skills**

Programming: C, C++, Python, Java, MATLAB, Verilog, Assembly, OpenGL, CUDA

Languages: English, Polish

## **Honors and Awards**

**Schlumberger Innovation Fellowship**, Schlumberger. 2017.

**Nvidia Graduate Fellowship**, Nvidia. 2017-2018.

**Best Student Presentation at Imaging and Applied Optics Congress**, OSA Foundation. 2017.

**James F. Gibbons Outstanding Student Teaching Award**, Stanford EE Department. 2017.

**Best Demo Award**, ICCP. 2016.

**Departmental Fellowship**, Stanford EE Department. 2014-2015.

**Dean's Honours List**, University of Toronto. 2011-2013.

**Frank H.R. Pounsett Memorial Scholarship**, University of Toronto. 2012.