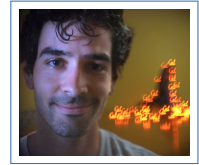


Nick Antipa

Curriculum Vitae

+1 (530) 902 9622
naantipa@gmail.com



Education

- 2014-present **PhD Candidate, University of California Berkeley, Electrical Engineering.**
Expected Summer 2019
Advisors: Laura Waller and Ren Ng
Research Area: Computational Imaging
- 2009 **MS, University of Rochester, Optics.**
Advisor: Julie Bentley
Thesis: *Effective Utilization of Off-the-Shelf Optics: Balancing application, performance, and cost.*
- 2008 **BS, University of California Davis, Optical Science and Engineering, GPA 3.89.**

Employment

- 2014-present **Graduate Student Researcher, UC Berkeley, Electrical Engineering and Computer Sciences (EECS).**
- 2009-2014 **Optics Engineer, Lawrence Livermore National Lab, National Ignition Facility (NIF), Livermore, California.**

Skills

- Coding Proficient with MATLAB and comfortable with Python
- Lens Design Comfortable with Zemax OpticStudio and familiar with Code V
- Optics In depth experience building lensless imagers and optical metrology systems. Highly experienced with interferometry, confocal surface profiling, depth sensing, lens design, geometric optics and aberration theory, physical optics, microscopy
- Algorithms Proficient with inverse problems, convex optimization, and compressed sensing, familiar with image processing and machine-learning

Selected Research and Projects

- 2018-2019 **Lensless compressive video, UC Berkeley.**
Lensless cameras produce highly multiplexed data. Rolling shutter sensors record images row-by-row at extremely high speeds (over 100,000 lines/second). By coupling lensless imaging with rolling shutter, each row from a single rolling shutter capture can be expanded into an entire 2D frame from a video.

- 2017-present **Compact neural imaging devices, UC Berkeley.**
I am designing compact (2 to 3 grams) head mountable fluorescent microscopes. The ultimate goal is a miniature system capable of time-resolved, *in-vivo* 3D imaging of fluorescent neural signal on freely behaving animals (e.g. mice).
- 2017-present **Lensless single-shot volumetric imaging, UC Berkeley.**
This prototype imaging system consists solely of a diffuser placed in front of an image sensor. By solving a large-scale compressed sensing-style inverse problem, 3D images of sparse scenes can be recovered from a single 2D measurement taken with this camera. I am working with a team to develop compact depth-capable cameras based on this approach.
- 2018-present **Simultaneous end-to-end optimization of optics and algorithms, UC Berkeley.**
To constrain the computational cost of image reconstruction and discover novel optical designs, I am exploring machine learning-inspired techniques for optical system design. The goal of this work-in-progress is to simultaneously optimize the optics and the reconstruction algorithm parameters for task-specific sensing problems (e.g. neural imaging).
- 2013-2014 **High-speed fiber-based photodiode characterization, LLNL.**
I designed and prototyped two different all-fiber systems for measuring the transfer function of high-speed (60 GHz bandwidth) photodiodes. The first used two frequency-tunable lasers to produce a heterodyne signal, providing amplitude transfer function characterization. The second relied on dispersion-broadening femtosecond pulses, which were then used to characterize the complex photodiode transfer function.
- 2012 **Endoscopic relay lens for imaging inner walls of NIF targets, LLNL.**
To enable viewing of the interiors of cylindrical NIF targets, I developed and built an endoscopic relay lens. This custom 5-element compound lens comprised only off-the-shelf optics, significantly lowering the cost and build time as compared to custom lens designs.

Journal or Journal Equivalent Publications

- 2019 **Nick Antipa***, Patrick Oare*, Emrah Bostan, Ren Ng, and Laura Waller. Video from stills: Lensless imaging with rolling shutter. *arXiv preprint arXiv:1905.13221*, 2019.
- 2018 **Nick Antipa***, Grace Kuo*, Reinhard Heckel, Ben Mildenhall, Emrah Bostan, Ren Ng, and Laura Waller. Diffusercam: lensless single-exposure 3d imaging. *Optica*, 5(1):1–9, 2018.
- 2016 Nicolas C Pégard, Hsiou-Yuan Liu, **Nick Antipa**, Maximillian Gerlock, Hillel Adesnik, and Laura Waller. Compressive light-field microscopy for 3d neural activity recording. *Optica*, 3(5):517–524, 2016.
- 2016 **Nicholas Antipa**, Sylvia Necula, Ren Ng, and Laura Waller. Single-shot diffuser-encoded light field imaging. In *Computational Photography (ICCP), 2016 IEEE International Conference on*, pages 1–11. IEEE, 2016.
- 2013 **Nick Antipa**, SH Baxamusa, ES Buice, AD Conder, MN Emerich, MS Flegel, CL Heinbockel, JB Horner, JE Fair, LM Kegelmeyer, and others. Automated ICF capsule characterization using confocal surface profilometry. *Fusion Science and Technology*, 63(2):151–159, 2013.

* indicates co-first authorship

Conference Abstracts and Technical Reports

- 2018 Grace Kuo, **Nick Antipa**, Ren Ng, and Laura Waller. 3d fluorescence microscopy with diffusercam. In *Computational Optical Sensing and Imaging*, pages CM3E–3. Optical Society of America, 2018.
- 2017 Grace Kuo, **Nick Antipa**, Ren Ng, and Laura Waller. Diffusercam: diffuser-based lensless cameras. In *Computational Optical Sensing and Imaging*, pages CTu3B–2. Optical Society of America, 2017.
- 2017 **Nick Antipa**, Grace Kuo, Ren Ng, and Laura Waller. 3d diffusercam: Single-shot compressive lensless imaging. In *Computational Optical Sensing and Imaging*, pages CM2B–2. Optical Society of America, 2017.
- 2016 AV Hamza, A Nikroo, E Alger, **N Antipa**, LJ Atherton, D Barker, S Baxamusa, S Bhandarkar, T Biesiada, E Buice, and others. Target development for the national ignition campaign. *Fusion Science and Technology*, 69(1):395–406, 2016.
- 2016 Gautam Gunjala, Aamod Shanker, Volker Jaedicke, **Nick Antipa**, and Laura Waller. Optical transfer function characterization using a weak diffuser. In *Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXIII*, volume 9713, page 971315. International Society for Optics and Photonics, 2016.
- 2015 Nicolas C Pegard, Evan Lyall, Alan Mardinly, **Nick Antipa**, Laura Waller, and Hillel Adesnik. High-speed 3d brain activity quantification with compressive light-field microscopy. In *Novel Techniques in Microscopy*, pages NW2C–3. Optical Society of America, 2015.
- 2015 Nicolas Pégard, Hsiou-Yuan Liu, **Nick Antipa**, Laura Waller, and Hillel Adesnik. Functional brain imaging at cellular resolution with compressive light-field microscopy. In *Imaging Systems and Applications*, pages JTh4A–3. Optical Society of America, 2015.
- 2015 LC Carlson, EL Alfonso, H Huang, A Nikroo, ME Schoff, MN Emerich, T Bunn, **Nick Antipa**, and JB Horner. Automation of NIF target characterization and laser ablation of domes using the 4pi system. *Fusion Science and Technology*, 67(4):762–770, 2015.
- 2014 JD Lindl, OL Landen, J Edwards, El Moses, and others. Erratum to physics of plasmas 21, 020501 (2014). *Phys. Plasmas*, 21:129902, 2014.
- 2013 DM Haas, H Huang, AQL Nguyen, K Sequoia, RB Stephens, A Nikroo, and **Nick Antipa**. Advancements in capsule surface defect characterization. *Fusion Science and Technology*, 63(2):160–168, 2013.
- 2013 Eric Buice, Richard C Montesanti, **Nicholas Antipa**, Alan D Conder, Michael A Johnson, and John S Taylor. Method and system for inspecting surfaces of miniature components, May 16 2013. US Patent App. 13/662,434.
- 2013 SH Baxamusa, SD Bhandarkar, JL Reynolds, B Maranville, J Horner, DC Mason, CL Heinbockel, **Nick Antipa**, and AD Conder. A solvent cleaning process for the outer surface of plastic ICF capsules. *Fusion Science and Technology*, 63(2):169–176, 2013.

- 2012 Daniel Potter and **Nick Antipa**. Visualization of target inspection data at the national ignition facility. *Fusion Engineering and Design*, 87(12):2136–2139, 2012.
- 2012 **Nick Antipa**. The capsule-fill-tube-assembly mapping system. *Proc. 20th Target Fabrication Mtg*, pages 20–24, 2012.
- 2011 ES Buice, ET Alger, **Nick Antipa**, SD Bhandarkar, TA Biesiada, AD Conder, EG Dzenitis, MS Flegel, AV Hamza, CL Heinbockel, and others. Development of a 3d surface mapping system to inspect capsule fill-tube assemblies used in laser-driven fusion targets. Technical report, Lawrence Livermore National Lab.(LLNL), Livermore, CA (United States), 2011.
- 2011 ES Buice, ET Alger, **Nick Antipa**, SD Bhandarkar, TA Biesiada, AD Conder, EG Dzenitis, MS Flegel, AV Hamza, CL Heinbockel, and others. 3d surface mapping of capsule fill-tube assemblies used in laser-driven fusion targets. Technical report, Lawrence Livermore National Lab.(LLNL), Livermore, CA (United States), 2011.

Students Mentored

- Undergrad **Sylvia Necula**, *Georgia Tech*, Summer 2015.
- Jon Silberstein**, *UC Berkeley*, Fall 2015.
- Camille Biscarrat**, *UC Berkeley*, Spring 2017 - Summer 2018.
- Shreyas Parthasarathy**, *UC Berkeley*, Spring 2017 - Summer 2018.
- Essence Hansberry**, *UC Berkeley*, Summer 2017.
- Patrick Oare**, *UC Berkeley*, Summer 2018 - present.
- Grad **Kyrollos Yanny**, *UC Berkeley*, Spring 2017 - present.

Teaching

- 2018 **EE123: Digital Signal Processing**, *Graduate Student Instructor*, Fall.
- 2015 **EE118/218a: Introduction to Optical Engineering**, *Graduate Student Instructor*, Fall.

Honors and Awards

- 2019 **Best Paper**, *Video from Stills: Lensless Imaging with Rolling Shutter*, IEEE International Conference on Computational Photography (ICCP).
- 2017 **Best Demo**, *DiffuserCam: A Diffuser-Based Lensless Camera*, IEEE International Conference on Computational Photography (ICCP).
- 2016 **Best Paper**, *Single-Shot Diffuser-Encoded Light Field Imaging*, IEEE International Conference on Computational Photography (ICCP).
- 2015 **Outstanding Graduate Student Instructor**, *Electrical Engineering 118/218a: Introduction to Optical Engineering*, UC Berkeley.
- 2012 **Engineering Division Award**, *Outstanding contribution to the National Ignition Facility Capsule Mapping System*, Lawrence Livermore National Laboratory.
- 2011 **NIF and Photon Science Award**, *Outstanding Contributions in Ignition Capsule Metrology*.

- 2010 **NIF and Photon Science Award**, *Development of Prototype Capsule Surface Inspection.*
- 2008 **Graduate with Highest Honors**, *UC Davis.*
- 2008 **Applied Science Departmental Citation**, *UC Davis.*