Kaelyn Danielle Leake

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Doctor of Philosophy, Electrical Engineering, 2015
University of California, Santa Cruz, Santa Cruz CA
Thesis: On-chip Particle Trapping and Manipulation

Bachelors of Science, Engineering Science and Physics, Magna Cum Laude, 2009
Sweet Briar College, Sweet Briar VA

Assistant Professor, Department of Physics, The Citadel, 2020-present

- Courses taught- College Physics Lab 1, Physics with Calculus I, Physics with Calculus Lab I, Optics, Research Planning, Optics Laboratory, Physics Capstone I, Physics Capstone II, and Sensors, Actuators and Microcontrollers
- College service- Enrollment Committee, first-year advising
- Department service- Major advising, update lab manual, Society of Physics Students club advisor
- Established an active optics research laboratory, emphasis on novel patterning of thin films, sensor systems, photonics, collaborating with undergraduate researchers
- Significant involvement teaching and designing innovative hands-on events for high school students to increase interest in STEM

Assistant Professor, Department of Engineering and Physics, Sweet Briar College, 2015-2020

- Courses taught- Circuits, Mechatronics, Systems Modeling and Controls, Senior Capstone, Statics, Dynamics, Material Science, Design Thinking, Introduction to Engineering
- Service- Assessment Committee, Curriculum Committee, Admissions Committee, Student Advancement Committee, advising, ABET assessment, high school outreach events
- Collaborated with students on design of automated system for layer-by-layer thin films
- Consultant for a large automotive company to design a high-sensitivity capacitive sensor for the measurement of air quantity in a fluid.

Teaching Assistant (2013-2015) and Research Assistant (2009-2015), Electrical Engineering Department, University of California, Santa Cruz, 2013-2015

- TA for- Modern Electronic Technology and How it Works, Designing a Sustainable Future, and Properties of Materials
- Used COMSOL and MATLAB to design an accurate particle manipulation simulation program
- Designed, simulated and tested optical sorting and trapping methods

Funded External Grants

Leake, K. (Principal), Yochum, H. M. (Co-Principal), Palmetto Academy Grant, South Carolina Space Grant, $15,000, May 31, 2023 to August 8, 2023, Sub-millimeter sized patterning via laser modification of layer-by-layer ionic self-assembly process

Leake, K. (Principal), Yochum, H. M. (Co-Principal), Palmetto Academy Grant, South Carolina Space Grant, $15,000, May 28, 2022 to August 4, 2022, Patterning via laser modification of layer-by-layer ionic self-assembly

Leake, K. (Principal), Yochum, H. M. (Co-Principal), Samuel Freeman Trust, $50,000, May 24 2022, Characterization of Nanoscale Structures for Optical Device Applications

Leake, K. (Principal), Yochum, H. M. (Co-Principal), Palmetto Academy Grant, South Carolina Space Grant, $15,000, May 28, 2021 to August 4, 2021, Novel Modified Layer-by-Layer Ionic Self-Assembly for 3D control

Funded Internal Grants

Leake, K. (Principal), Faculty Travel Grant, Swain Family School of Science and Mathematics, $2,000, July 1, 2022 to June 30, 2023, Layer by layer thin film fabrication within process laser patterning

Leake, K. (Principal), Faculty Research Grants, Swain Family School of Science and Mathematics, $3,000, July 1, 2021 to June 30, 2022, Layer-by-Layer Ionic Self-Assembly with 3D control

Briggs, P. (Principal), Leake, K. (Co-Principal), Lt. Col. James B. Near. Jr. Center for Climate Studies, The Citadel, $11,250, October 15, 2020 to December 15, 2021, Long-Term Study of Tides on the Ashley River: Flow Speed and Water Levels, C

Reviewer

Applied Optics
Applied Physics Letters
The Physics Teacher

Honors and Fellowships

C.A. Medbery Award for Dedication to Teaching, The Citadel, 2022
Outstanding TA Award, University of California, Santa Cruz, 2013-2014
QB3 Keck Fellowship, University of California, Santa Cruz, 2009-2010
Phi Beta Kappa, Inducted 2009
George H. Lenz Excellence in Physics Award, Sweet Briar College, 2009

Publications

K.D. Leake, A. Carter, and H. Yochum "Layer by layer thin film fabrication with in-process laser patterning", Proc. SPIE 12202, Nanoengineering: Fabrication, Properties, Optics, Thin Films, and Devices XIX, 1220203 (3 October 2022)

K.D. Leake, J. Martinez, A. Stensland, and H.Yochum “Three-dimensional control of layer by layer thin films via laser modification” Nanotechnology 33 305302 (2022).

H. Cai, **K.D. Leake**, and H. Schmidt, “Planer optofludics for on-chip particle manipulation”, Biomedical Optical Sensors: Differentiators for Winning Technologies, Springer (2020).

D. Ozcelik, H. Cai, **K.D. Leake**, A.R. Hawkins, and H. Schmidt, "Optofluidic bioanalysis: Fundamentals and applications", Nanophotonics (2017).

T.A. Wall, J. Parks, **K.D. Leake**, H. Schmidt and A.R. Hawkins, "Optofluidic Waveguiding for Biomedical Sensing", MRS Proceedings 1720, 953 (2015).

K.D. Leake, B.S. Phillips, T.D. Yuzvinsky, A.R. Hawkins, and H. Schmidt, "Optical particle sorting on an optofluidic chip", Optics Express, 21, 32605–32610 (2013). Also selected for the February 11, 2014 issue of the Virtual Journal for Biomedical Optics.

J.W. Parks, H. Cai, L. Zempoaltecatl, T.D. Yuzvinsky, **K. Leake**, A.R. Hawkins, and H. Schmidt, "Hybrid optofluidic integration", Lab on a Chip, 13, 4118-4123 (2013).

K.D. Leake, H. Schmidt, and A.R. Hawkins, "All-optical particle trap using orthogonally intersecting beams", Photonics Research, 1, 47-51 (2013).

Y. Zhao, **K. Leake**, P. Measor, M. Jenkins, J. Keeley, H. Schmidt, and A.R Hawkins, "Optimization of Interface Transmission between Integrated Solid Core and Optofluidic Waveguides", IEEE Photonics Technology Letters 24, 46-48 (2012).

Y. Zhao, M. Jenkins, P. Measor**, K. Leake**, S. Liu, H. Schmidt, and A. R. Hawkins, "Hollow Waveguides with Low Intrinsic Photoluminescence Fabricated with Ta2O5 and SiO2 Films," Applied Physics Letters 98, 091104 (2011).

A. Chen, M. M. Eberle, E.J. Lunt, S. Liu, **K. Leake**, M.I. Rudenko, A.R. Hawkins, and H. Schmidt, "Dual-color fluorescence cross-correlation spectroscopy on a planar optofluidic chip," Lab on Chip, 11(8), 1502-1506 (2011).

Conferences

K.D. Leake, A. Carter, and H. Yochum "Layer by layer thin film fabrication with in-process laser patterning", SPIE Optics & Photonics Conference, San Diego, August 21-25 (2022).

H. Yochum and **K.D. Leake**, "Informal Science for High School Students Over Video Conference", AAPT Summer Meeting, Virtual (2021).

K.D. Leake, J. Salvatore, C. Penfield, and J. Harris, "Design thinking as part of the core curriculum at Sweet Briar College", Engineering and Liberal Education Symposium, May 31- Jun 1 (2019).

K.D. Leake, "Explore Computer Science and Engineering", Design Thinking Experiment Exchange, May 23-24 (2018).

K.D. Leake, M. Olson, D. Ozcelik, A. Hawkins, and H. Schmidt, "Spectrally Reconfigurable Multi-Spot Trap on Optofluidic ARROW Chip", CLEO Conference, San Jose CA, May 10-15 (2015).

K.D. Leake, D. Ozcelik, B.S. Phillips, A.R. Hawkins, and H. Schmidt, "Advanced optical particle manipulation on an integrated optofluidic platform", SPIE Optics & Photonics Conference, San Diego, August 17-21 (2014).

H. Cai, J.W. Parks, T. Wall, **K. Leake**, T. Yuzvinsky, J. Kim, R. Carrion, J. Patterson, R.A. Mathies, A.R. Hawkins, and H. Schmidt, "Integrated optofluidics for on-chip biological

sample preparation and analysis", SPIE Photonics West Conference, San Francisco, CA, Feb 2-6 (2014).

D. Ozcelik, J. Parks, L. Zempoaltecatl, **K. Leake**, J. Black, Y. Lim, A.R. Hakwins, and H. Schmidt, "High Sensitivity Fluorescence Detection with Multi-spot Excitation Using Y-splitters", CLEO Conference, San Jose CA, June 9-14 (2013).

K.D. Leake, S. Mascharak, P. Measor, B.S. Philips, A.R. Hawkins, P. Mascharak, and H. Schmidt, "Manipulation, Trapping, and SERS Detection of Nanoparticle-Coated Microspheres in Optofluidic Waveguides", SPIE Photonics West Conference, San Francisco, CA, January (2012).

K.D. Leake, B.S. Philips, A.R. Hawkins, and H. Schmidt, "Sized-Based Optical Particle Sorting Using an Orthogonal Beam in Optofluidic Waveguides", CLEO/QELS conference, Baltimore, MD, (2011).

Y. Zhao, M. Jenkins, **K. Leake**, S. Liu, P. Measor, H. Schmidt, and A.R. Hawkins, "Optofluidic Waveguides with Ta2O5 Cladding Layers and Low Photoluminescence", CLEO/QELS conference, Baltimore, MD, (2011).

B.S. Phillips, J. Keeley, M. Rudenko, **K. Leake**, P. Measor, A. Chen, S. Liu, E. Lunt, H. Schmidt, and A.R. Hawkins, "Optimizing ARROW Transitions by Selective Deposition of Thin Films", Integrated Photonics Research, Silicon and Nano Photonics (IPR), Monterey, CA, July 25-28, (2010).

Presentations

Z.Vasquez, M. Groetsch, **K.D. Leake**, and H. Yochum, "Waveguides and layer-by-layer self assembly", Mid-Atlantic Conference on Undergraduate Scholarship, Randolph College, Lynchburg VA (2019)

M. Groetsch, Z.Vasquez, H. Yochum, and **K.D. Leake**, "Laser patterning of polymer films", Mid-Atlantic Conference on Undergraduate Scholarship, Randolph College, Lynchburg VA (2019)

L. Tucker, R. Runyon, **K.D. Leake**, and H. Yochum, "Laser heating of polymer films", Mid-Atlantic Conference on Undergraduate Scholarship , Sweet Briar College, Sweet Briar, VA (2018).

R. Runyon, L. Tucker, H. Yochum, and **K.D. Leake**, "Layer-by-layer based waveguide design", Mid-Atlantic Conference on Undergraduate Scholarship , Sweet Briar College, Sweet Briar, VA (2018).