

# Lucas R. Hofer

Ph.D. Candidate

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## Education

- 2019- **Ph.D. in Physics**, *University of Oxford*.
  - Thesis: Construction and Optimization of a Dual Potassium-Erbium Experiment.
- 2018 **M.Sc. in Physics**, *University of Stuttgart*.
  - Thesis: Towards Direct Laser Cooling of Dipolar Molecules.
- 2015 **B.Sc. in Physics**, *University of California, Los Angeles*.

## Research and Work Experience

- 2019- **Graduate Student Researcher**, *Physics Department*, University of Oxford.
  - Projects: Deep neural networks for analysis of atom cloud and laser beam images, design and construction of ultracold potassium experiment.
- 2018 **Research Scientist**, *DataRay Inc.*, Redding, CA.
  - Projects: Classification of Hermite-Gaussian laser modes using convolutional neural networks.
- 2017-2018 **Graduate Student Researcher**, *Physics Department*, University of Stuttgart.
  - Projects: Data acquisition software development with integrated SQL database, energy level and branching ratio calculations for BaF, design and construction of BaF laser cooling system.
- 2015-2016 **Technical Scientist**, *DataRay Inc.*, Redding, CA.
  - Projects: Python simulations for laser beam profiling research, scale factor correction for second moment beam radius measurements.
- 2015 **Postbaccalaureate Researcher**, *Physics Department*, University of California, Los Angeles.
  - Projects: FPGA control system and electronics to regulate a Mach-Zehnder interferometer's bias voltage, laser target system design for UCLA's Large Plasma Device.
- 2014 **Engineering Intern**, *Sof-Tek Inc.*, Redding, CA.
  - Project: Development of 8 Channel Thermocouple Voltage Simulator with PID control.

## Programming Skills

- Python, C/C++, Java, Spin.
- MATLAB, Mathematica, LabVIEW, LaTeX.
- Cloud computing, virtual machines, Google Cloud.

## Technical Skills

- Laser operation, laser construction, beam profiling.
- Electronics, custom circuit design.
- Computer-aided design (CAD), construction of custom hardware.
- Embedded microcontroller integration, motion control.

## Awards

- Ph.D. Scholarship, Department of Physics, University of Oxford, 2019-2022.
- Master's Fellowship, International Max Planck Research School for Condensed Matter Science, 2016-2018.
- Dean's Honor List, University of California Los Angeles, 2013, 2014, 2015.

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## Papers

- **L. R. Hofer**, M. Krstajić, P. Juhász, A.L. Marchant, R.P. Smith. Atom cloud detection and segmentation using a deep neural network, *Machine Learning: Science and Technology*, 2(4): 045008, 2021.
- **L. R. Hofer**, L.W. Jones, J.L. Goedert, and R. V. Dragone. Hermite–Gaussian mode detection via convolution neural networks, *Journal of the Optical Society of America A*, 36(6): 936-943, 2019.
- **L. R. Hofer**, R. V. Dragone, and A. D. MacGregor. Scale factor correction for Gaussian beam truncation in second moment beam radius measurements, *Optical Engineering*, 56(4): 043110, 2017.
- **L. R. Hofer**, D. B. Schaeffer, C. G. Constantin, and C. Niemann. Bias voltage control in pulsed applications for Mach-Zehnder electro-optic intensity modulators, *IEEE Transactions on Control Systems Technology*, 25(5): 1890-1895, 2017.
- R. Albrecht, M. Scharwaechter, T. Sixt, **L. R. Hofer** and T. Langen. Buffer-gas cooling, high-resolution spectroscopy, and optical cycling of barium monofluoride molecules, *Physical Review A*, 101(1): 013413, 2020.
- D. B. Schaeffer, **L. R. Hofer**, E.N. Knall, P.V. Heuer, C. G. Constantin, and C. Niemann. A platform for high-repetition-rate laser experiments on the Large Plasma Device, *High Power Laser Science and Engineering*, 6, 2018.
- P.V. Heuer, D. B. Schaeffer, E.N. Knall, C. G. Constantin, **L. R. Hofer**, S. Vincena, S. Tripathi, and C. Niemann. Fast gated imaging of the collisionless interaction of a laser-produced and magnetized ambient plasma, *High Energy Density Physics*, 22: 17-20, 2017.

## Submitted

- **L. R. Hofer**, M. Krstajić, R.P. Smith. Profiling Laser Beams with a Deep Neural Network, *Applied Optics*, 2021.

## Other Publications

- **L.R. Hofer**. Design and Construction of a Dual Erbium-Potassium Experiment, *1st Year Report*, University of Oxford, 2020.
- **L.R. Hofer**. Towards Direct Laser Cooling of Dipolar Molecules, *M.Sc. Thesis*, University of Stuttgart, 2018.

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## Teaching and Mentoring Experience

- 2021- **Atomic and Laser Physics Tutor**, *Worcester College*, University of Oxford.
  - Tutor for 3rd year undergraduate students in atomic and laser physics. Organized tutorials, taught students and marked collections.
- 2020 **4th Year Project Supervisor**, *Physics Department*, University of Oxford.
  - Supervised a 4th year undergrad's project on Zeeman slower simulations.
- 2019 **Summer Student Supervisor**, *Physics Department*, University of Oxford.
  - Supervised a summer student's project on using a spatial light modulator to trap atoms.

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## Other Experience

- 2021-2022 **Vice-President of the Graduate Common Room**, *Christ Church*, University of Oxford.
- 2020-2021 **Welfare Officer of the Graduate Common Room**, *Christ Church*, University of Oxford.

## Presentations

- Atom Cloud Detection and Segmentation Using a Deep Neural Network. DAMOP, May 2021.

## Students Mentored

- Igor Wasilewski (Undergrad, University of Oxford), 2020.
- Daniel Ruttley (Summer Student, University of Oxford), 2019.