Igor Gotlibovych, PhD (cantab)

A multidisciplinary problem-solver with world-class analytical skills

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Cambridge/London/Munich EN/DE/RU

Expertise

applied machine learning, deep learning, time series, visualisation

algorithms for control systems, image processing, simulations and data analysis

experimental and theoretical research in pure and applied topics

shaping product development in a multi-disciplinary team

design and manufacturing of electronic, optical and mechanical systems

multilingual writing and presentation, backed by experience in teaching and PR

professional software development using the latest tools and practices

`python scikit-learn keras tensorflow MATLAB C git svn TDD CI Mathematica LabVIEW CAD Excel`

Experience

`Jan 2018 - present$` **Senior Data Scientist** - *Jawbone Health*

I develop machine learning solutions for novel medical diagnostics. My main interests include:

- deep learning on multi-channel multi-source sensor data
- combining signal processing, Bayesian, and machine learning approches to unlock state-of-the-art performance

`Feb 2016 - Jan 2018` **Algorithm Development/Control Systems Engineer** - *Cambridge Mechatronics Limited*

I developed novel optical image stabilization and autofocus systems from R&D through to mass production. I worked with a multi-disciplinary team of firmware, software, and mechanical engineers, and collaborated with major players in the mobile electronics sector.

- designed and implemented advanced multi-dimensional closed-loop control algorithms for highly nonlinear thermally actuated systems, using `python` / `scipy` and `MATLAB` for prototyping and `C` for embedded implementation
- developed a range of `python`, `MATLAB` and `C` tools for real-time sensor data acquisition and processing - from supporting low-level serial communications through to applying machine learning techniques to optimize real-world product performance
- applied data science techniques to manufacturing data, identifying hardware and firmware problems in production, and optimizing information gain from quality control tests
- designed and implemented image acquisition, processing and feature extraction pipelines that allowed critical optimizations across a range of customer projects, using Android shell, `python` and `MATLAB`
- developed physical models and simulations combining thermal, mechanical and electrical processes, using efficient numerical implementations in `python` / `scipy`
- improved internal software development, testing and release processes, automating software, firmware and hardware tests from prototype PCB to handset level

`Apr 2014 - Oct 2016` **Professional Yacht Race Skipper** - *Clipper Ventures, various*

After completing my PhD, I have pursued a number of sailing projects: restoring an ocean-going yacht, teaching sailing, and working as a professional race skipped for a round-the-world yacht race.

- used a range of weather analysis, data collection and performance optimisation tools to ensure racing success, developed custom scripts for working with `grib` weather files
- fixing critical electronic and mechanical systems in extreme conditions was part of my daily routine
- oversaw budgeting, maintenance and day-to-day operations of a yacht with a crew of 20+ and a value in the 7-figures
- trained and lead an international team of 60+ sailors

- provided an engaging story for the stakeholders, customers and sponsors through regular blogs and multimedia

`Sep 2010 - Apr 2014` **PhD in ultra-cold atom physics** - *University of Cambridge*

I completed my PhD thesis on “Degenerate Bose Gases in a Uniform Potential”. The appeal of my chosen research field lies in combining experimental work with advanced theoretical understanding of condensed matter physics.

- developed custom image analysis tools and algorithms
- designed, manufactured and assembled custom vacuum, electronic, laser, and imaging systems
- implemented a real-time control and DAQ system with custom software and electronics
- used a combination of analytical, numerical, and computer algebra methods to develop a theoretical framework for describing a novel class of thermo-dynamic systems
- 🗐 authored multiple articles in top peer-reviewed journals

`Jun 2007 - Aug 2010` **Summer Research Student** - *Max-Planck Institute for Quantum Optics*

During my undergraduate years, I joined a Nobel-prize-winning research group in Munich as a summer student to work on developing new laser systems for precision metrology.

- I wrote high-performance code in C and Mathematica to simulate non-linear atomic and optical phenomena, aiding in the development of new laser systems
- My work lead to co-authoring two papers and presenting the results at seminars

`Sep 2006 - Jun 2010` **MSci in experimental and theoretical physics** - *University of Cambridge*

I took a combination of theory and math-intensive courses from the Mathematics and the Natural Sciences Tripos, achieving top grades throughout.

My Master’s thesis on “Microwave Manipulation of Ultracold Atoms” combined development of experimental microwave electronics, software control systems and a theoretical study of thermodynamics in reduced dimensionalities.

`Sep 1994 - Jul 2006` **High school diploma (Abitur)** - *Germany*

I completed the German Abitur top of the year with a grade of 1.0 (equivalent to an A* average), majoring in maths and physics. During my school years, I have won numerous awards for mathematics and science competitions.

🏆 Awards and Achievements

- Gates Cambridge Scholar
- Sir Nevill Mott Prize for best Master’s thesis
- Churchill College Scholar
- top of the year in Cambridge for three years running
- Scholar by the Cambridge European Trust
- Scholar of the German Studienstiftung
- Winner of the European Union Contest for Young Scientists
- captain and winner of the German team in the International Young Physicists' Tournament
- three-time gold medallist in the International Physics Olympiad
- part of the German selection for the International Mathematics Olympiad

Hobbies

Yacht Owner, Skipper and RYA Instructor

Mountaineer and climber

🗐 Publications

1. **Observing properties of an interacting homogeneous Bose-Einstein condensate: Heisenberg-limited momentum spread, interaction energy, and free-expansion dynamics**, I. Gotlibovych *et al.*, *Phys. Rev. A* **89**, 061604(R) (2014)
2. **Quantum Joule-Thomson Effect in a Saturated Homogeneous Bose Gas**, T. F. Schmidutz, I. Gotlibovych *et al.*, *Phys. Rev. Lett.* **112**, 040403 (2014)
3. Bose-Einstein Condensation of Atoms in a Uniform Potential, A. L. Gaunt, T. F. Schmidutz, I. Gotlibovych, R. P. Smith, and Z. Hadzibabic, *Phys. Rev. Lett.* **110**, 200406 (2013)
4. **A compact single-chamber apparatus for Bose-Einstein condensation of 87Rb**, I. Gotlibovych *et al.*, *arXiv:1212.4108* [cond-mat.quant-gas] (2012)
5. **XUV frequency combs**, A.Ozawa, A.Vernaleken, I.Gotlibovych, P.Hommelhoff, T.Udem, T.W.Hänsch, *Proceedings of SPIE 7728, Conference on Nonlinear Optics and Applications IV* (2010)
6. **Non-Collinear High Harmonic Generation: A Promising Outcoupling Method for Cavity-Assisted XUV Generation**, A. Ozawa, A. Vernaleken, W. Schneider, I. Gotlibovych et al., *Opt. Exp.* **16**, 6233-6239 (2008)