Henry F. Legg — Curriculum Vitae

Lecturer, School of Physics and Astronomy, University of St Andrews
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Current Position

University of St Andrews — **St Andrews, Scotland**
Lecturer — *Dec. 2024 – Present*
Leader: Topological & Quantum Devices Theory Group

Previous Employment

University of Basel — **Basel, Switzerland**
Postdoctoral Fellow — *July 2020 – Nov. 2024*
Condensed Matter Theory and Quantum Computing Group
Supervisors: Prof. Jelena Klinovaja & Prof. Daniel Loss

University of Cologne — **Cologne, Germany**
Postdoctoral Researcher — *Dec. 2019 – June 2020*
Group of Prof. Achim Rosch.

Education

University of Cologne — **Cologne, Germany**
PhD in Theoretical Physics — *Aug. 2015 – Nov. 2019*
Thesis: *Transport and Disorder in Dirac Materials*
Advisor: Prof. Achim Rosch.

University of St Andrews — **St Andrews, Scotland**
MPhys in Mathematics and Theoretical Physics — *2011–2015*
First-Class Honours; multiple academic prizes.

Research Interests

Quantum devices, topological materials, superconductivity, quantum computing, nonlinear responses

Selected Achievements/funding

2021–2024: Georg H. Endress Fellowship — *3 years funding (258k CHF ≈ 250k GBP)*
2016-2018: Honours branch of Bonn-Cologne Graduate School — *For high-performing PhD students*
2015: Master's Project Prize (St Andrews) — *Best thesis in theoretical physics, University of St Andrews*
2014: Brewster Prize (St Andrews) — *Top final-year performance in physics*

Publication statistics

30 publications/preprints, 700+ citations, h-index 13 (Google Scholar)
1 × Nature Nanotechnology, (2022) first author, initiated project
2 × Nature Physics, (2024) 1×main theory contributor
3 × Nature Communications, (2017,2021,2022) all either first author or main theory contribution
3 × PRL, 1×main theory contributor (2022), 1×supervising post-doc (Editors' Suggestion, 2023)

Selected Publications

2024: Long-range crossed Andreev reflection in topological insulator nanowires proximitized by a superconductor, *Nature Physics*, (2024). J Feng, HF Legg, M Bagchi, D Loss, J Klinovaja, Y Ando

2023: Trivial Andreev band mimicking topological bulk gap reopening in the nonlocal conductance of long rashba nanowires, *Physical Review Letters*, 130, 207001 (2023). R Hess, HF Legg, D Loss, J Klinovaja.

2022: Giant magnetochiral anisotropy from quantum confined surface states of topological insulator nanowires, *Nature Nanotechnology*, 17, 696–700 (2022). HF Legg, M Rößler, *et al.*

Invited Talks

Over 20 invited talks in Croatia, Germany, Ireland, Japan, USA, Switzerland, and the UK

Selected invited talks:

July 2024: Quantum Designer Physics, San Sebastian (Donostia), Spain

May 2024: Conference on Reproducibility in Condensed Matter Physics, University of Pittsburgh, USA

Sept. 2023: Max Planck Research Group Leader Symposium, Heidelberg, Germany

June 2023: Center for Emergent Matter Science, RIKEN, Tokyo, Japan

July 2022: SPICE Young Research Leaders Group Workshop, Mainz, Germany

Oct. 2021: Invited tutorial, CRC1238 Conference, Bad Honnef, Germany

Supervision

Supervised and co-supervised multiple PhD, Master, and Bachelor students.

Selected (co)-supervision experience:

July 2023 – Present: Peter Johannsen – PhD student, Loss group, Basel
Projects on superconducting and spin qubits.

Sept. 2022 – Present: Melina Lüthi – PhD student, Klinovaja group, Basel
Projects on planar Josephson junctions/poor man's Majoranas.

Jan 2021 – Nov. 2023: Richard Heß – PhD student, Klinovaja group, Basel
Andreev and Majorana bound states in low-dimensional systems. QCQT graduate school prize 2023.

Outreach

2023 – Present: Lead presenter & scriptwriter for **Tinguely Entangled**, quantum physics outreach concert: highlight of the Basel Infinity Festival, featured on the Swiss national news, and now performed worldwide.

Performances so far: Tinguely Museum, *Basel* [300 audience] (March 2023), Global Quantum Economy round table, *World Economic Forum in Davos* (Jan. 2024), *Tokyo* and *Osaka* (June 2024).

Future dates: APS March Meeting, *Royce Hall, Los Angeles* [Capacity of 1800] (March 2025), *Riga* (Aug. 2025).

2024 – Present: Lead presenter **Artificial Art - AI vs. Human Composers**, a "gameshow" showcasing the power of AI to produce art. Created in collaboration with the Responsible Digital Society Research Network (Basel) and featured on a special episode of the Swiss national TV science show "Einstein".

Performances so far: Voltahalle, *Basel* [450 audience] (March 2024), Kraftwerk, *Zurich* (Oct. 2024).

Selected Reviewer Activities

• Science Advances • Nature Communications • Physical Review Letters • Physical Review B
• Physical Review Research • SciPost • ACS Nano Letters • Communications Physics

Languages

English (native), German (B2), French (A2).