Calum Shelden
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Education

University of California, Davis (UCD) **09/2019-Present**
PhD, Electrical and Computer Engineering (ECE), 3.62/4.0 GPA
Minor: Materials Science
Advisor: Prof. Jeremy N. Munday

California State University, Long Beach (CSULB) **08/2015-05/2019**
B.S. Physics, 3.76/4.0 GPA
Advisor: Prof. Hadi Tavassol

Awards and Honors

15. UCD ECE Dissertation Fellowship — Fall 2025
14. UCD ECE Richard and Joy Dorf Graduate Student Award — 2025
13. UCD Summer Graduate Student Researcher Award — 2024
12. UCD ECE Advance to Candidacy Fellowship — 2024
11. UCD ECE Department Graduate Leadership Award — 2024
10. UCD Graduate Student Association (GSA) Spring Travel Award — 2023
9. American Physical Society (APS) Braslau Family Travel Grant — 2023
8. CSU-LSAMP PROUD Scholar — 2021
7. National Science Foundation Graduate Research Fellowship — 2021-2024
6. DoD National Defense Science and Engineering Graduate Fellowship – *declined* — 2021
5. UCD GAANN Fellowship — AY 2019-2020, AY 2020-2021
4. CSULB Magna Cum Laude — May 2019
3. CSULB Physics Departmental Honors — May 2019
2. CSULB Louis Stokes Alliance for Minority Participation (LSAMP) Fellowship — Spring 2019
1. CSULB President's List — Spring 2017, Fall 2017, Spring 2018, Fall 2018, & Spring 2019

News

2. UCD College of Engineering, "Controlling the (Casimir) Force" (2025) – https://engineering.ucdavis.edu/news/controlling-casimir-force.
1. UCD College of Engineering, "ECE Graduate Student Association Sparks Community" (2024) – https://engineering.ucdavis.edu/news/ece-graduate-student-association-sparks-community.

Publications

8. C. Shelden and Jeremy N. Munday, "A Simple Mechanical Cleaning Method for Colloidal Probes" – (submitted).
7. C. Shelden, B. Spreng, J. L. Garrett, T. S. Rahman, J. Kim, and J. N. Munday, "Casimir Force Control Enabled by 3D Nanostructures", *Nano Lett.* **25**, 9254 (2025) – **supplementary front cover**.
6. P. Lyu, T. Y. Peng, D. Kopper, C. Shelden, J. N. Munday, Y.J. Lu, and M. S. Leite, "Transition-Metal Nitrides for High-Temperature Structural Colors", *ACS Appl. Mater. Interfaces* **17**, 35673 (2025) – **supplementary front cover**.
5. C. Shelden, B. Spreng, and J. N. Munday, "Opportunities and Challenges Involving Repulsive Casimir Forces in Nanotechnology", *Appl. Phys. Rev.* **11**, 041325 (2024) – **front cover**.
4. B. Spreng, C. Shelden, T. Gong, and J. N. Munday, "Casimir repulsion with biased semiconductors", *Optica Quantum* **2**, 266 (2024) – **front cover**.
3. C. Shelden, B. Spreng, and J. N. Munday, "Enhanced Repulsive Casimir Forces between Gold and Thin Magnetodielectric Plates", *Physical Review A* **108**, 032817 (2023).
2. K. J. Palm, T. Gong, C. Shelden, E. Deniz, L. J. Krayer, M. S. Leite, and J. N. Munday, "Achieving Scalable Near-Zero-Index Materials", *Advanced Photonics Research* **3**, 2200109 (2022) – **inside front cover**.

1. T. Gong, M. R. Corrado, A. R. Mahbub, C. Shelden, and J. N. Munday, "Recent progress in engineering the Casimir effect – applications to nanophotonics, nanomechanics, and chemistry", *Nanophotonics* **10**, 523 (2020).

Presentations

8. C. Shelden, B. Spreng, and J. N. Munday, "How to levitate two-dimensional magnetic materials using repulsive Casimir forces," UCD College of Engineering *How Curious!* Graduate Student Research Series, Davis, CA (05/2024), oral.
7. C. Shelden, B. Spreng, and J. N. Munday, "Tuning repulsive Casimir forces between an ultra-thin magnetic material and a gold plate," 2024 ECExpo, Davis, CA (04/2024), poster.
6. C. Shelden, B. Spreng, and J. N. Munday, "Tuning repulsive Casimir forces between an ultra-thin magnetic material and a gold plate," 2023 ECExpo, Davis, CA (04/2023), poster.
5. C. Shelden, B. Spreng, and J. N. Munday, "Tuning repulsive Casimir forces between an ultra-thin magnetic material and a gold plate," 2023 APS March Meeting, Las Vegas, NV (03/2023), oral.
4. C. Shelden, B. Spreng, and J. N. Munday, "Levitating ultra-thin magnetodielectric materials using repulsive Casimir forces," 2023 SPIE Photonics West, San Francisco, CA (02/2023), oral.
3. C. Shelden, P. J. Santiago, and H. Tavassol, "Electrochemical Activity and Adsorbate Effects During Hydrogen Evolution Reactions on Ni/Au Overlayers," 2019 MRS Spring Meeting, Phoenix, AZ (04/2019), poster.
2. C. Shelden, A. Siwabessy, and H. Tavassol, "Chemomechanical Effects of Ni Alloys in Acidic Media," CSULB CNSM Student Research Symposium, Long Beach, CA (09/2018), poster.
1. C. Shelden, A. Siwabessy, and H. Tavassol, "Chemomechanical Effects of Surfaces with Respect to Hydrogen Evolution," UCI SoCal Undergraduate Research Symposium, Irvine, CA (07/2018), poster.

Professional Activities & Services

13. Lawrence Berkeley National Laboratory Affiliate — February 2024-Present
12. Social Media and Photography Officer for ECE-GSA — AY 2024-2025
11. President of the ECE-GSA — AY 2023-2024
10. Secretary of the ECE-GSA — AY 2022-2023

Outreach Activities

9. Letters to a Pre-Scientist — AY 2020-2021, AY 2022-2023, AY 2023-2024
8. The Social Scientist — 04/2020-Present
7. Math Day at the Beach – CSULB — 03/16/2018, 3/16/2019
6. Visit to Towers Elementary School — 04/28/2017

Teaching and Mentoring

5. Peer Mentor in ECE Student Mentorship Program – UCD (02/2024–Present)
4. Peer Mentor in ESTEME Undergraduate Mentoring Program – UCD (04/2021–Present)
3. Peer Mentor in the College of Natural Sciences and Mathematics: Mentor and Tutor a Caseload of Nine Freshman Science Students – CSULB (08/2018–05/2019)
2. Peer Instructor for NSCI 190A, course title: "Freshmen Experience Success Course" – CSULB (08/2017–12/2017, 08/2018–12/2018)
1. Peer Tutor in the College of Natural Sciences and Mathematics: Math and Physics – CSULB (08/2017–05/2018, 08/2018–05/2019)