Stanford



Ayush Agarwal

Postdoctoral Scholar, Chemical Engineering

Bio

BIO

Dr. Ayush Agarwal's research focuses on understanding how impurities influence the quality and electrochemical performance of recycled battery materials. He is particularly interested in resolving the chemical form and distribution of impurities and translating these insights into practical criteria for materials recovery, reuse, and recycling.

A chemical engineer with a PhD in Energy from EPFL, Ayush has worked across India, Sweden, the United States, Switzerland, and Germany in laboratory, pilot, and industrial settings. His background spans advanced analytical chemistry, trace contaminant and nanoparticle analysis, chemical process technologies, and environmental diagnostics.

His research is guided by a simple principle: we cannot improve what we cannot measure. More broadly, his work seeks to bring measurement science to real world challenges in resource efficiency, circularity, and sustainable technologies.

HONORS AND AWARDS

- Postdoc.Mobility Grant, Swiss National Science Foundation (2026)
- Conference Grant for Freely Selectable Analytics Conferences, German Chemical Society (GDCh) (July 2026)
- Best Poster Award, BNASS 2026: The 22nd Biennial National Atomic Spectroscopy Symposium, Royal Society of Chemistry (July 2026)
- 2025 International Atomic Spectroscopy Association Student Award, International Atomic Spectroscopy Association (October 2025)
- Chemistry Travel Grant 2025, Swiss Academy of Sciences (SCNAT) & Swiss Chemical Society (SCS) (July 2025)
- Enhancement Grant 2025, International Younger Chemists' Network (July 2025)
- Best Student Oral Presentation Award, 9th CHanalysis, Swiss Chemical Society (March 2025)
- ACS Graduate Student Symposium Planning Committee (GSSPC) Travel Grant, American Chemical Society (March 2024)
- Student Travel Grant, Swiss Group for Mass Spectrometry (SGMS) (February 2024)
- ACS DEI&R Travel Grant, American Chemical Society (August 2023)
- Best Poster Award – 2nd Prize, 26th ETH Nanoparticles Conference, ETH Zurich (June 2023)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Scientific Committee Member, European Congress of Chemical Engineering (Edinburgh, UK, 2027) (2026 - present)
- Independent evaluator, Doctoral Programme for Advancing Forest-Based Bioeconomy (2026 - present)
- Member of the 2026 Physical Sciences and Engineering (Chemistry and Chemical Engineering) Evaluation Committee for IP, UIP and DOK programme, Croatian Science Foundation (2026 - present)

- Scholarship Panelist, United Nations Institute for Training and Research (UNITAR) (2026 - 2026)
- Speaker, PostDocs@BAM (2026 - 2026)
- Newsletter Editor, Society for Applied Spectroscopy (SAS) (2026 - present)
- Atomic Spectrometry Updates (ASU) Editorial Board Member, Journal of Analytical Atomic Spectrometry (2025 - present)
- Judge, iGEM Grand Jamboree (2024 - 2024)
- Scientific Committee Member, European Biomass Conference & Exhibition (EUBCE) (2023 - 2025)
- Treasurer, International Young Chemists' Network (IYCN) (2023 - present)
- Official Tour Guide, PSI Visitor Center (2023 - 2025)
- Alumni Mentor, KTH Royal Institute of Technology (2021 - present)
- Student Representative, Doctoral Program in Energy (EDEY), École Polytechnique Fédérale de Lausanne (2021 - 2023)
- International Student Ambassador, KTH Royal Institute of Technology (2017 - 2019)

PROFESSIONAL EDUCATION

- Doctor of Sciences, École Polytechnique Fédérale de Lausanne, Switzerland , Energy (2025)
- Master of Science, KTH Royal Institute of Technology, Sweden , Chemical Science and Engineering (2019)
- Bachelor of Engineering, Birla Institute of Technology & Science, Pilani - K.K. Birla Goa Campus, India , Chemical Engineering (2015)

STANFORD ADVISORS

- William Tarpeh, Postdoctoral Faculty Sponsor

LINKS

- LinkedIn: https://www.linkedin.com/in/ayush09/
- Google Scholar: https://scholar.google.com/citations?user=Aft_61sAAAAJ&hl=en

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

State-Resolved Impurity Diagnostics for Recycled Cathode Materials

Publications

PUBLICATIONS

- **Atomic spectrometry update: review of advances in the analysis of metals, nanomaterials, polymers, fuels, electronic, nuclear, cultural heritage and forensic materials** *JOURNAL OF ANALYTICAL ATOMIC SPECTROMETRY*
  Agarwal, A., Bolea-Fernandez, E., Clough, R., Fisher, A., Gibson, B., Russell, B.
  2026
- **Sampling to analysis: simultaneous quantification of siloxanes and sulfur compounds in biogas for cleaner energy** *PROGRESS IN ENERGY*
  Agarwal, A., Torrent, L., Indlekofer, J., Bouchet, S., Culleton, L. P., Biollaz, S. M. A., Ludwig, C.
  2026; 8 (1)
- **Origin of alkali-metal loss in high-temperature synthesis of rechargeable battery layered oxide cathodes** *NEXT MATERIALS*
  Gatti, S., Agarwal, A., Torrent, L., Schuler, A., Trabesinger, S., Testino, A.
  2026; 10
- **Atomic spectrometry update: review of advances in the analysis of metals, chemicals and functional materials** *JOURNAL OF ANALYTICAL ATOMIC SPECTROMETRY*
  Agarwal, A., Bolea-Fernandez, E., Clough, R., Fisher, A., Gibson, B., Hill, S.

2025; 40 (11): 2982-3022

- **From proof to practice - Sampling and analysis for simplified quantification of siloxanes in biogas.** *Bioresource technology*
  Agarwal, A., Torrent, L., Indlekofer, J., Madi, H., Culleton, L. P., Biollaz, S. M., Ludwig, C.
  2025; 429: 132463
- **Abiotic stress approaches for enhancing cellulose and chitin production in Chlorella vulgaris.** *International journal of biological macromolecules*
  Zanchetta, E., Ollivier, M., Taing, N., Damergi, E., Agarwal, A., Ludwig, C., Pick, H.
  2025; 309 (Pt 4): 142969
- **Recycling rare earth metals from luminescent fibers by solvent extraction** *RESOURCES CONSERVATION & RECYCLING ADVANCES*
  Szczeszak, A., Agarwal, A., Torrent, L., Schuler, A. J., Grzyb, T., Przybylska, D., Ludwig, C., Patil, A. B.
  2025; 25
- **Scalable synthesis of Cu-cluster catalysts via spark ablation for the electrochemical conversion of CO₂ to acetaldehyde** *NATURE SYNTHESIS*
  Koolen, C., Pedersen, J., Zijlstra, B., Winzely, M., Zhang, J., Pfeiffer, T. V., Vrijburg, W., Li, M., Agarwal, A., Akbari, Z., Kuddusi, Y., Herranz, J., Safonova, et al
  2025; 4 (3)
- **Particle size effects in Ru/CNF catalysts during supercritical water gasification of glycerol** *APPLIED CATALYSIS B-ENVIRONMENT AND ENERGY*
  Hunston, C., Baudouin, D., Koning, L., Agarwal, A., Kroecher, O., Vogel, F.
  2023; 320
- **High-Throughput Sizing, Counting, and Elemental Analysis of Anisotropic Multimetallic Nanoparticles with Single- Particle Inductively Coupled Plasma Mass Spectrometry** *ACS NANO*
  Koolen, C., Torrent, L., Agarwal, A., Meili-Borovinskaya, O., Gasilova, N., Li, M., Luo, W., Zuttel, A.
  2022; 16 (8): 11968-11978
- **Understanding Degradation Effects of Elevated Temperature Operating Conditions in Polymer Electrolyte Water Electrolyzers** *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*
  Garbe, S., Futter, J., Agarwal, A., Tarik, M., Mularczyk, A. A., Schmidt, T. J., Gubler, L.
  2021; 168 (4)