Nathan B. Bartlett

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Location: Champaign, IL | U.S. Citizen

PROFESSIONAL SUMMARY

Ph.D. candidate in Plasma Engineering with industry experience supporting EUV lithography technology development. Proven track record designing, building, and operating complex high-vacuum and plasma systems; modeling ion and neutral transport; and delivering actionable engineering results for ASML. Combines experimental execution, diagnostics expertise, and computational modeling with strong problem-solving, collaboration, and system-level engineering thinking.

CORE STRENGTHS

- High-Vacuum Systems • EUV / Plasma Engineering • Thin-Film Processes • Ion Transport & Chemistry
- Diagnostics & Metrology • Rapid Prototyping • Computational Modeling • Cross-Functional Collaboration

EDUCATION

- Ph.D., Nuclear, Plasma & Radiological Engineering — University of Illinois at Urbana-Champaign *(Expected 2026)*
- M.S., Nuclear, Plasma & Radiological Engineering — UIUC *(2024)*
- B.S., Engineering Physics (Plasma Science Focus) — UIUC *(2020)*

INDUSTRY EXPERIENCE

Plasma Etch Scientist Intern — ASML, San Diego, CA *(2023 & 2024)*

- Developed models for plasma–gas interactions in EUV environments
- Designed experiments and QCM-based measurement approaches to quantify tin deposition
- Reviewed and consolidated 10+ years of internal documentation into a structured engineering guidance report
- Collaborated with multidisciplinary engineering teamst o install a metrology tool on and EUV test source.

External Contractor — Source Engineering Services / ASML *(2024–Present, Remote)*

- Supported EUV development initiatives as a post-internship contractor
- Improved plasma etch chemistry models; added new reaction pathways and high-speed simplified tools
- Delivered engineering-usable results enabling faster iteration and system understanding

RESEARCH EXPERIENCE

Graduate Research Assistant — Center for Plasma-Material Interactions, UIUC *(2021–Present)*

- Built and operated high-vacuum plasma deposition and etching experiment.
- Measured Sn–H_2 scattering cross sections; studied ion transport and chemical interactions
- Designed thin-film tin deposition and etching system; executed experiments and analysis
- Developed computational tools to extract transport properties from intermolecular potentials
- Extensive experience with RGAs, turbo pumps, matching networks, RF/microwave plasma sources, and diagnostics

Class B Intern — ITER Organization, France *(2019)*

- Investigated ammonia formation and plasma chemistry in reactor-relevant edge plasma environments
- Modified SOLPS-ITER / EIRENE Monte Carlo models to incorporate complex chemistry

SELECTED PUBLICATIONS & PRESENTATIONS

- Bartlett, N. et al. ***Elastic scattering cross sections and transport of tin ions in EUV lithography sources****,* Physica Scripta (2024)
- Jack Granat, Nathan Bartlett, David Ruzic, ***RGTfun: An Open-Source MATLAB App for Rarefied Gas Transport Coefficient Calculations****,* JOSS, In review.
- NWO Physics 2025 – ***The Plasma in EUV Sources that Does NOT Emit EUV Light***, Eindhoven, Netherlands

TECHNICAL SKILLS

- Programming / Modeling: Python, MATLAB, Fortran, SRIM/TRIM, RustBCA, Monte Carlo simulations
  Systems & Hardware: High-vacuum systems, RF / microwave plasmas, sputtering systems, QCMs, RGAs, gauges
  Diagnostics: SEM, confocal microscopy, Langmuir probes, Faraday cups, thermal diagnostics