Noah Eckman

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Education

STANFORD UNIVERSITY | Ph.D. Candidate, Chemical Engineering | M.S. 2024 | Advisor: Prof. Eric Appel | GPA: 3.94 **2021 –Expected 2026**

UNIVERSITY OF MARYLAND, COLLEGE PARK | B.S. Chemical Engineering, *Magna Cum Laude* | GPA: 3.94 **2016 – 2020**

Technical Experience

PHD CANDIDATE | APPEL GROUP, STANFORD UNIVERSITY **JAN 2021 – PRESENT**

- Work with advisor Prof. Eric Appel on rheology of injectable hydrogels for applications in adoptive cell therapy (ACT). Using advanced rheological techniques to understand dynamic hydrogel systems. Mathematical modeling of mass transport from dynamic hydrogels. Optimization of hydrogel delivery systems for ACT. Developed collaborations with groups at Stanford and internationally. Work presented AICHE 2022, Bioinspired Materials Gordon Research Conference 2024, AICHE 2025, SOR 2025, Biomaterials GRC 2025. Works published in *Biomaterials Science, Macromolecules, Nature Reviews Bioengineering*; other manuscripts in preparation.

RESEARCHER | BIOINSPIRED ADVANCED MANUFACTURING LAB, UNIV. OF MARYLAND **JAN 2019 – JUNE 2020**

- Researched use of in-situ direct laser writing for graphene nanoplatelet-loaded microelectronic structures. Work included optimization of photosensitive polymers, manufacturing process for production of nanoplatelets, and dynamic laser writing- enabled 3D printing. Worked in MATLAB with image processing to create 3D figures of printed structures. Co-author conference presentation at *MicroTas 2019.* Publication in *Advanced Materials Technologies.*

RESEARCHER | ZACHARIAH GROUP, UNIV. OF MARYLAND **FEB 2017 – JAN 2019**

- Explored using 3D printing to create polymer propellant structures loaded with nanothermite mixtures. Work ranged from developing software to move the printer head to developing procedures to code the printer, prepare solutions, and printing energetic films and wires. Utilized slow-motion videography to analyze combustion kinetics and characteristics. Published in *Advanced Materials*, *Applied Physics Letters,* and *Combustion and Flame,* as well as three conference oral presentations.

SOFTWARE ENGINEER, AUTONOMY TEST & EVALUATION | JOHNS HOPKINS APPLIED PHYSICS LAB **OCT 2020 – AUG 2021**

- Conducted applied research in the Ocean Systems and Engineering group at JHUAPL. Development in Python, Matlab, C++, QT, Gradle, Jenkins. Worked both in software development and in chemical engineering. Projects ranged from CI/CD pipeline development, development of novel methods for unmanned platform autonomy testing, automated testing and experimental setup of pressure-swing oxygen purification systems, metal-organic framework gas phase catalysis and electrochemistry.

ENGINEERING INTERN | OFFICE OF NAVAL INTELLIGENCE **MAY 2019 – AUG 2019**

- Worked as an engineer supporting the Technical Collections unit at ONI. Helped design maritime sensor suites by performing market research and design analysis for backup power and optics sensors. Wrote Python scripts to manage data exfiltration and analysis.

NSF REU FELLOW | ENERGY AND PROPULSION REU, TEXAS A&M UNIVERSITY **MAY 2018 – AUG 2018**

- Designed and performed novel experimental investigation into thermal properties of aqueous SiO_2 nanofluids and their performance in a chevron-plate heat exchanger. Analyzed data in MATLAB. Presented work to group leaders as well as at TAMU Engineering poster session.

Leadership Experience

STUDENT MEMBER | ANIMAL CARE AND USE COMMITTEE, STANFORD UNIVERSITY **SEP 2023 – PRESENT**

- Review the use of laboratory animals at Stanford to ensure ethical and humane treatment of animals. Perform review of proposed protocol and carry out site visit inspections.

CHAIR | STUDENT FACILITES FUND SUBCOMMITEE, UNIV. OF MARYLAND **JAN 2017 – AUG 2019**

- Directed the soliciting of proposals and the allocation of funds from a $3M pool. As first leader of this committee, successfully oversaw two years of student-based facilities improvement projects worth over $1.5M. Coordinated student leaders and University staff.

CHIEF OF STAFF & SPEAKER OF THE LEGISLATURE | UMD STUDENT GOVERNMENT ASSOCIATION **SEPT 2016 – MAY 2020**

- Represented Clark School of Engineering students for three years on the Legislature, including as Speaker of the Legislature, then served as a mentor and adviser as Chief of Staff. Consistently advocated for student interests, from revamping sexual assault prevention training to advocating for student athlete rights. Worked as a leader of leaders helping student group executives with group recognition and funding.

Awards and Qualifications

- *NSF Graduate Research Fellowship Program*, Fellow (2023).
- 1st prize, Stanford Polymer Collective Poster Session (2024).
- President, Stanford Birdwatching Club (2024-25).
- *High Pass,* Chemical Engineering Ph.D. Oral Qualifying Exam (2022).
- *Department of Chemical and Biomolecular Engineering Chair's Award*, University of Maryland (presented for excellence in academics, outstanding service to the department, or leadership in the department, 2020).
- *Bud Thomas Award* (Senior with most significant contributions to Student Government Association), University of Maryland (2020). Press coverage here and here.
- *Maryland Medallion Society* (Top 25 graduating senior; contributed significantly to the general advancement of the interests of the University of Maryland and displayed outstanding involvement and leadership in campus activities, 2020).
- *Special Achievement Award*, JHUAPL, for leadership on Field Tests (2020-21).
- *Hon. Gordon England Engineering Scholarship* (Fall 2019).
- *Future Leader in Chemical Engineering*, NC State University (October 2019).
- *A. James Clark Board of Visitors Endowed Scholarship* (Fall 2018).
- *Walter Schymik Undergraduate Research and Internship Scholarship* (Fall 2018).
- *Outstanding Co-Op/Intern Award*, JHUAPL and A. James Clark School of Engineering (April 2018).
- Omicron Delta Kappa, National Leadership Honor Society (Spring 2018), *Top Ten Freshmen Leader* (April 2017).
- Software Development: MATLAB/Python/C++/Gradle/Jenkins

Teaching and Mentorship

- *Instructor,* Stanford Splash. Taught course on culinary fluid dynamics to underserved Bay Area high school students (2022).
- Mentor for a Stanford Undergraduate student in Bioengineering, Appel Lab, 2022-2024.
- Teaching Assistant, Fundamentals and Applications of Spectroscopy, with Prof. Danielle Mai, Stanford University, 2025.
- Teaching Assistant, Polymer Physics, with Prof. Danielle Mai, Stanford University, 2024.
- Teaching Assistant, Organic Chemistry Lab II, with Dr. Lee Friedman, University of Maryland, 2017-2020 (5 semesters).
- Teaching Assistant, Separations Processes, with Prof. Amy Karlsson, University of Maryland, 2020.
- Teaching Assistant, The Arts and Humanities in Practice, with Dr. Yvonne Slosarski, University of Maryland, 2018.

Publications/Presentations

Journal Publications:

1. **Eckman, N.,** Appel E.A. (2025). Crosslink Dynamics Control Injection Force and Flow Profiles of Non-Covalent Gels. ***Macromolecules.*** https://doi.org/10.1021/acs.macromol.5c00854

2. **Eckman, N.,** *et al.* (2025). Crosslink strength governs yielding behavior in dynamically crosslinked hydrogels. ***Biomaterials Science.*** https://doi.org/10.1039/D4BM01323A

3. **Eckman, N.,** Nejatfard, A., Cavet, R., Grosskopf, A.K., Appel, E.A. (2024). Biomaterials to enhance adoptive cell therapy. ***Nature Reviews Bioengineering.*** https://doi.org/10.1038/s44222-023-00148-z

4. Song, Y.E., **Eckman, N.,** *et al.* (2025). Highly Extensible Physically Crosslinked Hydrogels for High-Speed 3D Bioprinting. ***Advanced Healthcare Materials.*** https://doi.org/10.1002/adhm.202404988

5. Bailey, S.J., **Eckman, N.,** *et al.* (2025). A thiol–ene click-based strategy to customize injectable polymer–nanoparticle hydrogel properties for therapeutic delivery. ***Biomaterials Science.*** https://doi.org/10.1039/D4BM01315H

6. Prossnitz, A., Nguyen, L.T., **Eckman, N.,** *et al.* (2025) Defining Structure-Function Relationships of Amphiphilic Excipients Enables Rational Design of Ultra-Stable Biopharmaceuticals. ***Advanced Science.*** https://doi.org/10.1002/advs.202409604

7. Jons, C.K., Prossnitz, A.P., **Eckman, N.,** Dong, C., Utz, A., Appel, E.A. (2024). Glassy Surfactants Enable Ultra-High Concentration Biologic Therapeutics. *In Review.* https://www.biorxiv.org/content/10.1101/2024.09.09.612104.abstract

8. Meany, E.L. *et al.,* **Eckman, N.** *et al.* (2025). Generation of an inflammatory niche in an injectable hydrogel depot through recruitment of key immune cells improves efficacy of mRNA vaccines. ***Science Advances.*** https://www.biorxiv.org/content/10.1101/2024.07.05.602305v1

9. Kong, G., *et al.,* **Eckman, N.,** *et al.* (2025). Clonally expanded, targetable, natural killer-like NKG7 T cells seed the aged spinal cord to disrupt myeloid-dependent wound healing. ***Neuron.*** https://doi.org/10.1016/j.neuron.2024.12.012

10. Yan, J., Ou, B., Saouaf, O., Meany, E., **Eckman, N.**, Appel, E.A. (2024). A regimen compression strategy for commercial vaccines leveraging an injectable hydrogel depot technology for sustained vaccine exposure. ***Advanced Therapeutics***, 2300108. https://doi.org/10.1002/adtp.202300108

11. Tang, S. *et al.,* **Eckman, N.** *et al.* (2024). Label-Free Composition Analysis of Supramolecular Polymer–Nanoparticle Hydrogels by Reversed-Phase Liquid Chromatography Coupled with a Charged Aerosol Detector. ***Analytical Chemistry,*** 96(15). https://doi.org/10.1021/acs.analchem.3c05747

12. Kroo, L. A., Binagia, J. P., **Eckman, N.**, Prakash, M., & Shaqfeh, E. S. (2022). A freely suspended robotic swimmer propelled by viscoelastic normal stresses. ***Journal of Fluid Mechanics***, 944. https://doi.org/10.1017/jfm.2022.485

13. Restaino, M., **Eckman, N**., Alsharhan, A. T., Lamont, A. C., Anderson, J., Weinstein, D., Hall, A., Sochol, R. D. (2019) In Situ Direct Laser Writing of 3D Graphene-Laden Microstructures. ***Advanced Materials Technologies***, 2100222. https://doi.org/10.1002/admt.202100222

14. Wang, H., Shen, J., Kline, D. J., **Eckman, N.**, Agrawal, N. R., Wu, T., & Zachariah, M. R. (2019). Direct Writing of a 90 wt% Particle Loading Nanothermite. ***Advanced Materials***, 1806575. https://doi.org/10.1002/adma.201806575

15. Kline, D. J., Rehwoldt, M. C., Wang, H., **Eckman, N.**, & Zachariah, M. R. (2019). Why does adding a poor thermal conductor increase propagation rate in solid propellants? ***Applied Physics Letters***, 115(11), 114101. https://doi.org/10.1063/1.5113612

16. Rehwoldt, M., Wang, H., Wu, T., **Eckman, N**., Wang, P., Agrawal, N., & Zachariah, M.R. (2019) Ignition and Combustion Analysis of Direct Write Fabricated Aluminum/Metal Oxide/PVDF Composites. ***Combustion and Flame*** 211 (2020): 260:69. https://doi.org/10.1016/j.combustflame.2019.08.023

Conference Presentations:

1. Surprises in injection force and flow rheology of physical hydrogels. **Eckman, N**, Appel E.A. AICHE 2025. Boston, MA. (Upcoming).
2. Hydrogel encapsulation of probiotic microbes to engineer plant drought resistance. **Eckman, N.** et al. AICHE 2025. Boston, MA. (Upcoming).
3. Surprises in injection force and flow rheology of physical hydrogels. **Eckman, N**, Appel E.A. 2025 Society of Rheology Meeting. Santa Fe, NM (Upcoming).
4. Surprises in injection force and flow rheology of physical hydrogels. **Eckman, N**, Appel E.A. (Poster). 2025 Biomaterials Gordon Research Conference. Barcelona, 26 July 2024.
5. Using Non-Equilibrium Rheology to Design Injectable Hydrogels for Adoptive Cell Therapy. **Eckman, N.** et al. (Poster). 2024 Bioinspired Materials Gordon Research Conference. Les Diablerets, Switzerland, 18 Jun 2024.
6. Non-Equilibrium characterization of injectable polymer/nanoparticle hydrogels. **Eckman, N.** *et al.* 2022 AICHE Annual Meeting, Phoenix AZ, 17 Nov 2022.