Alex Abramson

Phone: (314) 215-9100
Email: aabramson6@gatech.edu
Website: http://www.abramsonlab.com

901 Atlantic Drive NW
Room 4120B
Atlanta, GA 30318

Appointments

Assistant Professor, Georgia Institute of Technology, Atlanta, GA — 2022 - Present
School of Chemical and Biomolecular Engineering

Education

Postdoc **Stanford University,** NIH Ruth L. Kirschstein Fellowship — 2019 - 2022
Advisers: Zhenan Bao, Sanjiv S. Gambhir

PhD **Massachusetts Institute of Technology,** Chemical Engineering — 2019
Dissertation: "Ingestible capsules for therapeutic injections in the gastrointestinal tract"
Advisers: Robert Langer, Giovanni Traverso

BS **Johns Hopkins University,** Chemical and Biomolecular Engineering — 2015
Tau Beta Pi Engineering Honors Society, Maryland Alpha Chapter.

Research interests

Wearable and ingestible medical devices hold profound implications in medicine, supporting a new generation of personalized and automated therapies with higher patient compliance and faster diagnostic feedback. My research program develops technologies that physically interact with targeted tissues through programmable geometric and material transformations to enable previously unachievable therapeutic and sensing capabilities. My work has led to the successful development of devices such as ingestible capsules capable of macromolecule drug delivery and conformal bioelectronic sensors that monitoring tumor progression in real time.

Honors and awards

MIT Technology Review 35 Top Innovators Under 35 (Link)	2022
Forbes 30 Under 30 - Science (Link)	2022
Stanford Wearable Electronics Initiative Service Award	2021
Stanford eWEAR Research Award	2021
NIH (NIBIB) Ruth L. Kirschstein F32 Fellowship	2020
NSF GRFP Research Fellowship	2017
NSF REU Fellowship	2014
Johns Hopkins Provost Undergraduate Research Award	2014
Johns Hopkins Call for Innovation Award	2014

Publications (GOOGLE SCHOLAR)

Journal Articles

10. A Abramson, C Chan, Y Khan, A Mermin-Bunnell, N Matsuhisa, R Fong, R Shad, P Mallick, W Hiesinger, SS Gambhir, Z Bao. "A flexible electronic strain sensor for the real-time monitoring of tumor regression." ***Science Advances*** (In Press). (Link)

9. A Abramson*, AR Kirtane*, Y Shi*, G Zhong, J Collins, S Tamang, K Ishida, A Hayward, J Wainer, NU Rajesh, X Lu, Y Gao, P Karandikar, A Wahane, D Reker, MR Frederiksen, B Jensen, R Langer, G Traverso. "Oral mRNA delivery using capsule-mediated gastrointestinal tissue injections." ***Matter***. (2022). (Link)

8. A Abramson*, MR Frederiksen*, A Vegge*, B Jensen, M Poulsen, B Mouridsen, MO Jespersen, RK Kirk, J Windum, F Hubálek, JJ Water, J Fels, SB Gunnarsson, MWH Ley, X Lu, J Wainer, J Collins, S Tamang, K Ishida, A Hayward, P Herskind, ST Buckley, N Roxhed, R Langer, U Rahbek, G Traverso. "Ingestible robotic capsule injectors for oral delivery of systemic monoclonal antibodies, peptides and small molecules." ***Nature Biotechnology,*** (2021). (Link)

7. A Abramson, D Dellal, YL Kong, J Zhou, Y Gao, J Collins, S Tamang, A Hayward, J Wainer, R McManus, MR Frederiksen, JJ Water, B Jensen, N Roxhed, R Langer, G Traverso, "Ingestible transiently anchoring electronics for microstimulation and conductive signaling." ***Science Advances***, 6.35 (2020). (Link)

6. A Abramson**,** E Caffarel-Salvador, M Khang, D Dellal, D Silverstein, Y Gao, MR Frederiksem, A Vegge, F Hubalek, JJ Water, AV Friderichsen, J Fels, RK Kirk, C Cleveland, J Collins, S Tamang, A Hayward, T Landh, ST Buckley, N Roxhed, U Rahbek**,** R Langer, G Traverso, "An Ingestible Self-Orienting System for Oral Delivery of Macromolecules." ***Science***, 363.6427 (2019): 611-615. (Link)

5. A Abramson*, E Caffarel-Salvador*, V Soares, D Minahan, X Lu, RY Tian, D Dellal, Y Gao, S Kim, J Wainer, J Collins, S Tamang, A Hayward, T Yoshitake, HC Lee, J Fujimoto, J Fels, MR Frederiksen, U Rahbek, N Roxhed, R Langer, G Traverso., "A luminal unfolding microneedle injector for oral delivery of macromolecules." ***Nature Medicine***, 25.10 (2019): 1512-1518. (Link)

4. A Abramson, F Halperin, J Kim, G Traverso, "Quantifying the value of orally delivered biologic therapies: A cost-effectiveness analysis of oral semaglutide." ***Journal of Pharmaceutical Sciences,*** 108.9 (2019): 3138-3145. (Link)

3. C Steiger, A Abramson, P Nadeau, A Chandrakasan, R Langer, G Traverso, "Ingestible electronics for diagnostics and therapy." ***Nature Reviews Materials*** 4.2 (2019): 83-98. (Link)

2. E Caffarel-Salvador*, A Abramson*, R Langer, G Traverso, "Oral delivery of biologics using drug-device combinations." ***Current opinion in pharmacology***, 36 (2017): 8-13. (Link)

1. X Guan, H Chen, A Abramson**,** H Man, J Wu, O Yu, BJ Nikolau, "A phosphopantetheinyl transferase that is essential for mitochondrial fatty acid biosynthesis." ***The plant journal,*** 84.4 (2015): 718-732. (Link)

Book Chapters

1. E Gultepe, Q Jin, A Choi, A Abramson, DH Gracias, "Miniaturized Untethered Tools for Surgery." *Micro-and Nanomanipulation Tools*. (2015). (Link)

Conference Papers

1. A Abramson, E Gultepe, S Pandey, DH Gracias, "Pollen inspired microscrapers for minimally invasive statistical tissue sampling." *2018 IEEE Micro Electro Mechanical Systems (MEMS)* (pp. 357-361). IEEE. (Link)

Patents and Patent applications

14. **A Abramson**, Z Bao, "Flexible Electronic Strain Sensor for the Real-time Monitoring of Tumor Progression," US Application: 63/230,428

13. MS Williams, JSW Li, J Coffey, CWJ Steiger, M Jimenez, RS Langer, EC Salvador, **A Abramson**, "Single or Multi-dose Delivery Platform for Veterinary Applications," US Application: 16696233

12. R Langer, G Traverso, **A Abramson,** MR Frederiksen, MO Jespersen, B Mouridsen, J Windum, M Poulsen, B Jensen, JJ Water, MWH Ley, X Lu, "Systems and Methods for Liquid Injection," US Application: 16/778,152

11. **A Abramson**, MR Frederiksen, B Jensen, MO Jespersen, G Traverso, "Silicone Valve API Compartment Sealing Barrier," US Patent Application No.: 16/619,579

10. G Traverso, **A Abramson**, EC Salvador, N Roxhed, M Khang, T Bensel, D Dellal, R Langer, "Tissue Anchoring Articles," PCT/US2018/033204.

9. R Langer, D Minahan, **A Abramson**, EC Salvador, V Soares, "Actuating Components and Related Methods." U.S. Provisional Application No.: 62/767,710

8. G Traverso, **A Abramson**, EC Salvador, N Roxhed, M Khang, T Bensel, R Langer, "Components with High API Loading," PCT/US2018/033193.
7. G Traverso, **A Abramson**, EC Salvador, N Roxhed, M Khang, T Bensel, R Langer, "Self-Righting Articles," PCT/US2018/033183.
6. G Traverso, **A Abramson**, EC Salvador, N Roxhed, M Khang, T Bensel, R Langer, JJ Water, MR Frederiksen, BU Kristiansen, MO Jespersen, M Poulsen, P Herskind, B Jensen, "Self-Righting Systems and Related Components and Methods," PCT/US2018/033217.
5. G Traverso, **A Abramson**, EC Salvador, N Roxhed, M Khang, T Bensel, R Langer, "Self-Righting Systems, Methods and Related Components," PCT/US2018/033210.
4. G Traverso, **A Abramson**, EC Salvador, N Roxhed, M Khang, T Bensel, R Langer, "Self-Actuating Articles," PCT/US2018/033187.
3. R Langer, G Traverso, **A Abramson**, D Dellal, CWJ Steiger, N Roxhed, EC Salvador, V Soares, D Minahan, MR Frederiksen, "Quick Release Capsules," PCT/US2019/032777.
2. R Langer, G Traverso, **A Abramson**, D Dellal, "Systems for Electrical Stimulation," PCT/US2019/032773.
1. **A Abramson**, R Alvarez, P Patel "Sudsy Water Fixture," Unites States Patent, No. 20150315771A1.

Invited Talks

22. UT Southwestern Biomedical Engineering, March, 2022.
21. Brigham and Women's Hospital Engineering in Medicine, March 2022.
20. Caltech Medical Engineering, Feb, 2022.
19. University of Michigan Chemical Engineering, Feb, 2022.
18. UCLA, Mechanical Engineering, Feb, 2022.
17. Ohio State Chemical Engineering, Jan, 2022.
16. Oregon State Bioengineering, Jan, 2022.
15. Georgia Tech Chemical Engineering, Jan, 2022.
14. Johns Hopkins School of Medicine, Oct, 2021.
13. Boulder Peptide Symposium, Oct, 2021.
12. University of Washington Mechanical Engineering, April, 2021.
11. USC ITEMS Institute, April, 2021.
10. Texas A&M EnMed, March, 2021.
9. Dartmouth University Thayer Engineering School, March, 2021.
8. New York University Dept. of Biomedical Engineering, Feb., 2021.
7. Johns Hopkins University ChemBE Department, Jan., 2021.
6. MIT Faculty Forum Online, Feb., 2020. https://youtu.be/quaDRq-WHVQ
5. Stanford Diabetes Research Center, Feb., 2020.
4. Diabetes Technology Meeting, Nov., 2019.
3. Eli Lilly Company Seminar, April, 2019.
2. Stanford Wearable Electronics Initiative, March, 2019.
1. BioACCESS Global Health Seminar, Feb., 2019.

Professional Experience

Novo Nordisk, Copenhagen, DK 2019 - Present
Scientific Consultant

Accenture, Washington, DC 2015
Business and Technology Consultant

Teaching and mentoring Experience

Stanford University, Stanford, CA 2020 to Present
ChEM-H Fellow Mentor, Chemical Engineering

- Program pairs postdoctoral fellows with undergraduate students to provide research mentorship and training. Involves mentorship classes. Mentored a total of 3 students.

Massachusetts Institute of Technology, Cambridge, MA Sept 2018 to Dec 2018
Teaching Assistant, Chemical Engineering

- Assisted in teaching Transport Processes, an undergraduate course averaging 50 students per semester, covering the following topics: principles of heat and mass transfer; steady and transient conduction and diffusion. Developed quizzes, exams, and homework. Ran office hours and recitations.

Massachusetts Institute of Technology, Cambridge, MA 2016 to 2019
Research Mentor, Undergraduate Research Opportunities Program

- Mentored a total of 7 students, all of whom became co-authors on papers and patents.

Johns Hopkins University, Baltimore, MD 2012 to 2014
Tutor, JHU Learning Den

- Led tutoring services in thermodynamics and calculus 2x/week for groups of 6 students.

Outreach and Community Service

East Palo Alto Tutoring and Training (EPATT)
Mentor and Tutor, Stanford, CA,
2019-Current. (2h/week)

Cambridge Elementary School
Math Tutor, Cambridge, MA,
2016-2019. (2h/week)

Squashwise
STEM Mentor, Baltimore, MD,
2012-2014. (3h/week).

MIT Sandbox Program
Start-up Fellow Mentor, Cambridge, MA,
2016-2019. (5h/week)

MIT ChemE Graduate Student Council
Board Member, Cambridge, MA,
2016-2017. (1h/week)

Diversity Equity And Inclusion

Stanford University, Stanford, CA 2021 to 2022
Executive Board Member, Stanford Chemical Engineering DEI Committee

Professional Affiliations

AICHE, 2015-Present
Controlled Release Society, 2017-Present
BMES, 2021-Present
Peer Reviewer for Science Advances, Journal of Controlled Release