

CURRICULUM VITAE

ALICE AMITRANO

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EDUCATION

- ⇒ September 2026-Current
Postdoctoral Associate, Biomedical Engineering, Yale University
Advisor: Professor Rong Fan
- ⇒ May 2026-August 2026
Postdoctoral Fellow Chemical and Biomolecular Engineering Johns Hopkins University
Advisor: Professor Konstantinos Konstantopoulos
- ⇒ August 2021-May 2026
Doctor of Philosophy (PhD) Chemical and Biomolecular Engineering, Johns Hopkins University
Advisor: Professor Konstantinos Konstantopoulos
- ⇒ February 2019-June 2021
Bachelor of Science (BS) in Chemical Engineering, University of Delaware
Advisor: Professor Thomas Epps

EXPERIENCE

Postdoctoral Associate | Yale University, New Haven, CT (September 2026-Current)
Advisor: Prof. Rong Fan

- Develop microfluidic and spatial-omics approaches to investigate how the mechanical tumor microenvironment shapes cancer cell states, spatial niches, and metastatic progression.
- Integrate microfluidic phenotyping, single-cell and spatial molecular profiling, and lineage-tracing approaches to connect mechanical selection with cell-state evolution.
- Investigate how mechanically selected cancer cell populations emerge, persist, and contribute to invasive and metastatic behavior

Graduate Research Assistant | Postdoctoral Fellow | Johns Hopkins University, Baltimore, MD (November 2021-August 2026)

Advisor: Prof. Konstantinos Konstantopoulos

- Lead multidisciplinary studies on how confinement, stiffness, shear stress, pH, and fluid viscosity modulate cancer cell migration, stem cell differentiation, and T cell function.
- Engineer viscoelastic hydrogels and microfluidic devices to mimic *in vivo* mechanical environments and quantify migration, invasion, and cell fate.
- Utilize MAqCI (Microfluidic Assay for Quantification of Cell Invasion) to predict metastatic potential with >87% accuracy in glioblastoma and 100% accuracy in breast cancer biopsies, enabling the identification of new therapeutics for GBM and personalized treatment strategies for breast cancer patients.

- Characterize migration mode-specific metabolic rewiring in cancer cells by integrating live-cell metabolic biosensors, Seahorse XF analysis, gene knockdown, and confocal imaging, with a focus on ion channel-dependent pH regulation, hypoxia-driven adaptations, and glycolytic versus mitochondrial energy shifts, with the goal of identifying metabolic vulnerabilities as therapeutic targets.
- Dissect mechanotransduction pathways governing breast cancer migration, focusing on ion channels and cytoskeletal dynamics, to identify actionable therapeutic targets.
- Model age-related immune dysfunction by investigating how confinement and elevated extracellular fluid viscosity restore a youthful migratory and activation phenotype in T cells from older donors.
- Mentor junior trainees in experimental design, hydrogel/microfluidic techniques, microscopy, and data analysis.

Undergraduate Researcher (B.S.) | University of Delaware, Newark, DE (August 2019-June 2021)

Advisor: Prof. Thomas H. Epps, III

- Successfully 3D printed bio-renewable polymers derived from lignin, optimizing material properties for targeted additive manufacturing applications.
- Employed molecular docking simulations to evaluate the estrogen receptor binding affinity of bio-based small molecules compared to BPA, assessing potential endocrine-disrupting activity
- Contributed to the design and screening of renewable monomer candidates for integration into safe, high-performance polymers

PEER-REVIEWED PUBLICATIONS (*: first or co-first author)

1. **Amitrano A.***, Mahajan J.S.*, Korley L.T., Epps T.H., Estrogenic Activity of Lignin-derivable Alternatives to Bisphenol-A Assessed via Molecular Docking Simulations. *RSC Advances*, 11(36), 22149-22158 (2021).
2. O'Dea R.M.*, Pranda P.A.*, Luo Y., **Amitrano A.**, Ebikade E.O., Gottlieb E.R., Ajao O., Benali M., Vlachos D.G., Ierapetritou M., Epps T.H. III, Ambient-pressure lignin valorization to high-performance polymers by intensified reductive catalytic deconstruction. *Science Advances*, 8(3), eabj7523 (2022).
3. Afthinos A.*, Bera K.*, Chen J., Ozcelikkale A., **Amitrano A.**, Choudhury M.I., Huang R., Pachidis P., Mistrionis P., Chen Y., Konstantopoulos K., Migration and 3D Traction Force Measurement inside Compliant Microchannels. *Nano Letters*, 22(18), 7318-7327 (2022).
4. **Amitrano A.***, Yuan Q.*, Agarwal B., Sen A., Dance Y.W., Zuo Y., Phillip J.M., Gu L., Konstantopoulos K., Extracellular fluid viscosity regulates human mesenchymal stem cell lineage and function. *Science Advances*, 11(1), eadr5023 (2025).
5. **Amitrano A.***, Choudhury D.*, Konstantopoulos K., Navigating Confinement: Mechanotransduction and Metabolic Adaptation. *Current Opinion in Cell Biology*, 94, 102487 (2025).
6. Tran A.T.*, Wisniewski E.O.*, Mistrionis P.*, Stoletov K., Parlani M., **Amitrano A.**, Ifemembi B., Lee S.J., Bera K., Zhang Y., Tuntithavornwat S., Afthinos A., Kiepas A., Jamieson J.J., Zuo Y., Habib D., Wu P.-H., Martin S.S., Gerecht S., Gu L., Lewis J.D., Kalab P., Friedl P., Konstantopoulos K., Cytoplasmic accumulation and plasma membrane association of anillin and Ect2 promote confined migration and invasion. *Nature Materials*, 24, 1476-1488 (2025).
7. Ranjan Si B., Yuan Q., Nath S., Agarwal B., **Amitrano A.**, Choudhury D., Konstantopoulos K., Engineered in vitro platforms for mechanochemical control of cell migration. Book chapter, *Cold Spring Harbor Perspectives*, 10, a041795, (2025).
8. Ni Q.*, Ge Z.*, Sen A.*, Wu Y., Fu J., **Amitrano A.**, Srivastava N., Konstantopoulos K., Sun S., Chemical Compensation to Mechanical Loss in Cell Mechanosensation. *PNAS*, 122 (45) e2507935122, (2025).
9. Lee S.J.*, **Amitrano A.***, Yuan Q.*, Choudhury D.*, Stoletov K., Agarwal B., Tran A., Godet I., McCann J., Huizar R., Serra S.A., Picón-Pagès P., Valles N., Sofou S., Tao J., Fan C.-M., Lewis J.D., Sun S.X., Ewald A.J., Gilkes D.M., Bajpai V.K., Valverde M.A., Konstantopoulos K., Hypoxia restores the acidosis-induced inhibition of cancer cell dissemination. *Cell reports*, 45, 2, 116970, (2026).

10. Nath S.*, Choudhury D.*, **Amitrano A.***, Konstantinos Konstantopoulos. Not Just Soft: Cell Viscosity Emerges as a Driver of Tumor Cell Dissemination. *Cancer Research*, CAN-26-1081 (2026).
11. Yuan Q.*, **Amitrano A.***, Choudhury D.*, Konstantopoulos K., Protocol for optogenetic stimulation of cells under physical confinement. *STAR Protocols by CellPress*, 7, 3, 104754 (2026).
12. Stoletov K., Karimian S. S., Brown D., **Amitrano A.**, Si R. B., Verma M. V., Gupta S., Bukhari A., Lamb S., Konstantopoulos K., Wong K. G., Lewis D. J., Adrenomedullin 2 drives intratumoral cancer cell invasion, intravasation and metastasis. *Oncogene*, (2026)
13. Dance Y., **Amitrano A.**, Macaluso N., Min C., , Thompson L., Saffron A., Saffron M. A., Ge Z., Smith M. I., , Ezenwanne C., Milcik N., Fennell A., Pyndell A. K., Szczesny C., Langdon J., Ursitti J., Ward C., Stroka K., Walston J., Sun S., Konstantopoulos K., Phillip M. J., Acute priming using elevated fluid viscosity recovers ‘young-like’ single-cell surveillance behaviors in aged human T cells. *Nature Communications* (2026)
14. **Amitrano A.***, Choudhury D.*, Ifemembi B., Afthinos A., Stoletov K., Yuan Q., Nath S., Agarwal B., Graziano G., Gao J., Ceisel A., Ranjan Si B., Valverde M., Lewis J., Mumm J., Konstantopoulos K., Mechanochemical cues control the coupling of metabolic and migratory patterns in cancer. *Nature Cell Biology (In Review, 2026)*; Preprint available at bioRxiv, 2026.
15. Hanna E.A., **Amitrano A.**, Forjaz A., Bai Z., Min C., Dance Y., Etoh I., Lloyd B., Jiang X., Quiergo V., Nair P., Duarte V., Joshi S., Konstantopoulos K., Phillip J., Fan. R, Wu H., Wirtz D., Reprogramming CAR-T cell function through synthetic cytokine receptors suppresses metastatic progression of TNBC. *To be submitted* (2026).
16. Portuallo M., Aprati T., An L., Hallis S., Yu K., Field M., Rosemthal W., Temkar S., **Amitrano A.**, Zhang B., Romero V., Begu S., Smart V., Elad V., Ahmed W., Jagirdar K., Coutts K., Toska E., Warriar G., Lipson E., Gudjonsson J., Khaddour K., Lian C., Liu Q., Lu D., Nanda V., Davier M., Ji H., Kieme A., Sunshine J., Konstantopoulos K., Gu L., Alicea G., Holmen S., Liu D., Rebecca V., Site-specific tissue mechanics define melanoma identity and metastatic capacity. *Cancer Discovery (Submitted, 2026)*

INVITED LECTURES AND PRESENTATIONS

- Invited Scientist, Pine View School Research Journal Club, January 2027.
Student-led scientific paper discussion and Q&A with the author
- Invited Guest Lecture, University of Pittsburgh, October 2026.
Microfluidics for studying cell migration and mechanobiology
- AICHE Annual Meeting, Boston, MA, 2025. Oral presentation:
Substrate compliance rewires cytoskeletal and metabolic pathways to drive confined cancer cell migration.
- 2nd Maryland Stem Cell Symposium and Workshop, Baltimore, MD, 2025. Poster presentation:
Extracellular fluid viscosity regulates human mesenchymal stem cell lineage and function
- BMES Annual Meeting, San Diego, CA, 2025. Oral presentation:
Substrate compliance rewires cytoskeletal and metabolic pathways to drive confined cancer cell migration.
- Inquisitive Minds Retreat, Washington DC, 2025. Oral presentation:
MAqCI: a microfluidic assay for the prognostication and screening of breast cancer patients.
- AICHE Annual Meeting, San Diego, CA, 2024. Oral presentation:
Acidosis-Mediated Inhibition of Cancer Cell Dissemination Is Restored By Hypoxia.
- BMES Annual Meeting, Baltimore, MD, 2024. Oral presentation:
Acidosis-Mediated Inhibition of Cancer Cell Dissemination Is Restored By Hypoxia.
- AICHE Annual Meeting, Orlando, FL, 2023. Oral presentation:
Cancer Cell Migration in Physiologically Relevant Confining Microenvironments.
- ACS Spring, Virtual, 2021. Oral presentation:

Molecular Docking Simulations to Assess the Estrogenic Activity of Lignin-Derivable Bisphenol A Alternatives and Their Polymerization via Additive Manufacturing.

- 25th Annual Green Chemistry & Engineering Conference, Virtual, 2021. Oral presentation:
Molecular Docking Simulations to Assess the Estrogenic Activity of Lignin-Derivable Bisphenol A Alternatives.

PATENTS

1. Jude Marvin Phillip, Yoseph Dance, Konstantinos Konstantopoulos, **Alice Amitrano**, *Approach to Mechanically Reprogram Single-cell Behaviors of Immune Cells*, (JHU ref: C18610, Provisional Application)
2. Konstantinos Konstantopoulos, **Alice Amitrano**, Qinling Yuan, Bhawana Agarwal, Yoseph Dance, Yi Zuo, Jude M. Phillip, Luo Gu, *Regulation of Human Mesenchymal Stem Cell Lineage and Function by Extracellular Fluid Viscosity* (JHU ref: D18641, Provisional Application)

SCIENTIFIC LEADERSHIP AND PROFESSIONAL SERVICE

- **Selected Mentor**, Seeds of Success: STEMM Ambassadors Program, Yale University, 2026-2027.
Mentoring and empowering students through STEMM education, scientific outreach, and career development
- **Session Co-Chair**, AIChE Annual Meeting, Minneapolis, MN, November 2026
New Approach Methodologies for Understanding and Predicting Human Health Outcomes II

MENTORING

1. **REU Student Mentor**, Johns Hopkins University, Konstantopoulos lab, Summer 2024
Ella Wallace, Undergraduate Student from Washington and Lee University.
2. **Graduate Students Mentor**, Johns Hopkins University, Konstantopoulos lab, 2022-Current
Bishwa Ranjan Si, Graduate Student at Johns Hopkins University, Konstantopoulos lab
Bhawana Agarwal, Graduate Student at Johns Hopkins University, Konstantopoulos lab
Josiah Power, Graduate Student at Johns Hopkins University, Konstantopoulos lab
Jake Remmert, Graduate Student at Johns Hopkins University, Konstantopoulos lab
Xuefei Lu, Graduate Student at Johns Hopkins University, Konstantopoulos lab
Iris Sloan, Graduate Student at Johns Hopkins University, Konstantopoulos lab
3. **Undergraduate Students Mentor**
Evelyn Cheng, Undergraduate Student at Johns Hopkins University, Konstantopoulos lab
4. **AIChE Mentor**, Johns Hopkins University, 2024-2025
Kayley Sanchez Forbes, Undergraduate Student at Johns Hopkins University.
Current position: Undergraduate researcher in Gracias Lab at Johns Hopkins University.

UNIVERSITY LEADERSHIP

- **International Graduate Students Leader (Fall 2022-Fall 2025)**, International Students at Hopkins (ISAH), Johns Hopkins University
 - Serve as the lead advocate for the international graduate student community, effectively communicating student concerns to university leadership and influencing institutional support initiatives.
 - Designed and executed high-impact programming, including immigration Q&A panels, cross-cultural workshops, and social events, in collaboration with the Office of International Services (OIS) and the Life Design Lab (LDL), significantly increasing engagement and resource accessibility.
 - Spearheaded the creation of tailored support systems addressing academic transitions, cultural integration, and professional development, leading to measurable improvements in student satisfaction.

- Launched and managed the International Students Mentoring Program, which successfully paired over 100 new international students with peer mentors, enhancing early adjustment and fostering a sense of belonging.
- **Graduate Chair for Professional Development (Fall 2023-Fall 2024)**, Graduate Representative Organization (GRO), Johns Hopkins University
 - Curated and implemented professional development programs focused on diverse career paths, equipping graduate students with skills for both academic and industry trajectories.
 - Advocated for and secured expanded institutional support for career development resources, including access to alumni networks and industry-specific workshops.
 - Led comprehensive feedback initiatives to continuously adapt programming based on student input, resulting in increased attendance and improved alignment with evolving career interests.

PEER REVIEW RESPONSABILITIES

International Journal of Biochemistry and Cell Biology (1), Gene reports (1), Journal of Cell Science (2), Cell Report Methods (1), APL Bioengineering (1), Advances in Cancer Biology (2), Molecular Medicine (1).

RECOGNITION

1. **Fulcrum Science Scholarship (Translational grant)**- Fulcrum, 2026
2. **WSE Doctoral Excellence in Leadership Award**- Johns Hopkins University, 2025
3. **Undergraduate Research Award**- University of Delaware, 2021
4. **Second Year Student Excellence Award**- WVU Tech, 2018
5. **First Year Student Excellence Award**- WVU Tech, 2017