



Hawa Racine Thiam

Assistant Professor of Bioengineering and of Microbiology and Immunology

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BIO

Hawa Racine Thiam is an Assistant Professor of Bioengineering and of Microbiology and Immunology and a Sarafan ChEM-H Institute Scholar at Stanford. Her lab combines microscopy, microfabrication, quantitative Cell Biology and Immunology to investigate the cellular biophysical mechanisms immune cells use to defend the host and maintain homeostasis. Her lab currently focuses on NETosis; an intriguing cell-scale process during which neutrophils respond to danger signals (e.g., pathogens) by releasing their chromatin to the extracellular environment where it can trap and neutralize pathogens but also worsen inflammation. Hawa Racine's long-term goal is to combine what we learn studying the cellular biophysics of immune cells, together with engineering principles to manipulate, predict and re-design innate immune cells and improve human health.

Hawa Racine earned her high school diploma in Senegal, her B.S in Physics and M.S in Physics for Biological systems from Paris Diderot University, then her Ph. D in Biophysics working with Dr. Matthieu Piel at Institut Curie where she developed microfabricated devices and discovered a novel function of branched actin networks in squeezing the nucleus during immune cell migration under confinement. She then joined Dr. Clare Waterman's lab at the NIH where she combined high-resolution microscopy and other quantitative cell biology approaches to reveal the cellular mechanism of NETosis, opening new avenues for understanding this extreme cell behavior.

ACADEMIC APPOINTMENTS

- Assistant Professor, Bioengineering
- Assistant Professor, Microbiology and Immunology
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Institute Scholar, Sarafan ChEM-H

ADMINISTRATIVE APPOINTMENTS

- Esther Ehrman Lazard Faculty Scholar, School of Medicine, (2022-2025)
- Investigator, Chan Zuckerberg Biohub, (2022-2027)

HONORS AND AWARDS

- 2026 Margaret Oakley Dayhoff Award, Biophysical Society (2025)
- Packard Fellow, The David and Lucile Packard Foundation (2024)
- Science News 2024 SN 10: Scientists to Watch, Science News (2024)
- Early Career Development Award, Koret Foundation (2023)
- Dr. Laure Aurelian Biomedical Research Awardee, Dr. Laure Aurelian Biomedical Research Endowment (2023)

- Investigator, Chan Zuckerberg Biohub (2022-2027)
- Gabilan Faculty Fellow, Stanford University (2022 - 2024)
- Cell Press News 1000 Inspiring Black Scientists in America, Cell Press (2020)
- Stanford.Berkeley.UCSF Next Generation Faculty Awardee, Stanford University, UC Berkeley, UCSF (2020)
- Rising Stars in Biological Engineering, Princeton University (2020)
- ASCB Porter Prize for Research Excellence – Honorable Mention, American Society for Cell Biology (2020)
- Fellow Award for Research Excellence, National Institutes of Health (2019)
- Lenfant Fellowship Award, National Heart, Lung and Blood Institute; NIH (2017-2019)
- 4th year Ph.D. Fellowship, La Ligue Contre le Cancer (2013-2014)
- Ph.D. Fellowship - Curie International Ph.D. Program, Institut Curie (2010-2013)
- Undergraduate Fellowship, The Senegalese Government (2005-2010)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, Biophysical Society (2023 - present)
- Member, American Society for Cell Biology (2013 - present)

PROFESSIONAL EDUCATION

- Postdoctoral Fellow, National Heart, Lung and Blood Institute, NIH , Quantitative Cell Biology, Molecular Biology (2022)
- Ph.D., Institut Curie / Paris Descartes University , Biophysics (2014)
- M.S., Paris Diderot University , Physics for Biological Systems (2010)
- B.S., Paris Diderot University , Physics (2008)

LINKS

- HR Thiam Lab Site: <https://hrthiamlab.stanford.edu/home>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our current work has two branches. Branch #1 is building a quantitative and predictive understanding of how neutrophils initiate and complete NETosis. Branch #2 is identifying the molecular and biophysical mechanisms that regulate high deformability in neutrophils. These branches converge onto understanding and harnessing the impact of nuclear biophysics on immune cell functions to re-engineer neutrophils for improved health.

Teaching

COURSES

2025-26

- Microfluidic Device Laboratory: BIOE 301D, GENE 207 (Win)
- Physical Biology: BIOE 42 (Spr)

2024-25

- Microfluidic Device Laboratory: BIOE 301D (Win)
- Physical Biology: BIOE 42 (Spr)

2023-24

- Microfluidic Device Laboratory: BIOE 301D, GENE 207 (Spr)

2022-23

- Microfluidic Device Laboratory: BIOE 301D, GENE 207 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Naomi Alyafei, Leslie Chan, Christopher Choi, Alea Delmastro, Bianca Edozie, Jeandele Elliot, Jeanna Enriquez, John Heath, Ayaka Kasamatsu

Orals Chair

Alana Gudinas

Postdoctoral Faculty Sponsor

Minwoo Kang, Kiwon Park, Manasi Sawant

Doctoral Dissertation Advisor (AC)

Aidan Cabral, Andre Gu, Jihyun In, Allen Yesin

Doctoral Dissertation Co-Advisor (AC)

Kennedy Outlaw

Doctoral (Program)

Krishna Bhambhani, Owen Dunkley, Shreya Garg, You He

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Biophysics (Phd Program)
- Immunology (Phd Program)

Publications

PUBLICATIONS

- **Nuclear mechanobiology rules immune cells' functions: from differentiation to cell trafficking and pathogen killing.** *Nucleus (Austin, Tex.)*
Renkawitz, J., Yesin, A., Kroll, J., Cabral, A. T., D'Annunzio, S., Thiam, H. R.
2026; 17 (1): 2590843
- **In vitro generated neutrophils reveal high deformability is an emergent property**
Yesin, A., Flores, R., Thiam, H.
CELL PRESS.2026: 399a
- **Neutrophils Plasma Membrane Lipid Order Decreases and Is Required for Efficient Neutrophil Extracellular Trap Release**
Tauer, P., Cabral, A. T., Westerhausen, C., Thiam, H.
SPRINGER.2025: S142-S143
- **Chromatin is a long-range force generator that regulates plasma membrane tension and cell integrity independently of gene expression** [preprint] *bioRxiv*
Cabral, A. T., Sawant, M., Kang, M., Liangqi, X., Thiam, H.
2025
- **Calculation of the force field required for nucleus deformation during cell migration through constrictions** *PLOS COMPUTATIONAL BIOLOGY*
Estabrook, I. D., Thiam, H., Piel, M., Hawkins, R. J.
2021; 17 (5): e1008592
- **NETosis proceeds by cytoskeleton and endomembrane disassembly and PAD4-mediated chromatin decondensation and nuclear envelope rupture** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*

- Thiam, H., Wong, S., Qiu, R., Kittisopikul, M., Vahabikashi, A., Goldman, A. E., Goldman, R. D., Wagner, D. D., Waterman, C. M.
2020; 117 (13): 7326-7337
- **Cellular Mechanisms of NETosis** *ANNUAL REVIEW OF CELL AND DEVELOPMENTAL BIOLOGY, VOL 36, 2020*
Thiam, H., Wong, S., Wagner, D. D., Waterman, C. M.
edited by Lehmann, R.
2020; 36: 191-218
 - **Perinuclear Arp2/3-driven actin polymerization enables nuclear deformation to facilitate cell migration through complex environments** *NATURE COMMUNICATIONS*
Thiam, H., Vargas, P., Carpi, N., Crespo, C., Raab, M., Terriac, E., King, M. C., Jacobelli, J., Alberts, A. S., Stradal, T., Lennon-Dumenil, A., Piel, M.
2016; 7: 10997
 - **A mechanical model to investigate the role of the nucleus during confined cell migration**
Allena, R., Thiam, H., Piel, M., Aubry, D.
TAYLOR & FRANCIS LTD.2015: 1868-1869
 - **Investigation of Regulation and Binding Patterns of the Human Cathelicidin Peptide LL-37 in Complexation with Nucleic Acids, and its Impact on Neutrophil Extracellular Traps.** *bioRxiv : the preprint server for biology*
Zielke, C., Rad, B., Nielsen, J. E., Li, J., Pimcharoen, S., Sawant, M., Lin, J. S., Thiam, H. R., Barron, A. E.
2026
 - **Autoantibody hotspots reveal the origin and impact of immunogenic XIST ribonucleoprotein complexes in autoimmune diseases.** *The Journal of clinical investigation*
Yan, B., Lee, J., Srinivasan, S., Ambriz, P., Shi, Q., Dou, D. R., Davuluri, S., Nandyala, S., Woods, A., Leatherman, G., Zhao, Y., Reggiardo, R. E., Sawant, et al
2026
 - **Explosive cytotoxicity of 'ruptoblasts' bridges hormonal surveillance and immune defense.** *bioRxiv : the preprint server for biology*
Chai, C., Sultan, E., Sarkar, S. R., Zhong, L., Sarfati, D. N., Gershoni-Yahalom, O., Jacobs-Wagner, C., Thiam, H. R., Rosental, B., Wang, B.
2025
 - **Engineering Cell-Specific Protein Delivery Vehicles for Erythroid Lineage Cells.** *ACS bio & med chem Au*
Setegne, M. T., Cabral, A. T., Tiwari, A., Shen, F., Thiam, H. R., Dassama, L. M.
2025; 5 (2): 268-282
 - **REPLY TO LIU: The disassembly of the actin cytoskeleton is an early event during NETosis** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Thiam, H., Wong, S., Qiu, R., Kittisopikul, M., Vahabikashi, A., Goldman, A. E., Goldman, R. D., Wagner, D. D., Waterman, C. M.
2020; 117 (37): 22655-22656
 - **NETosis proceeds via a defined series of cytoskeleton and endomembrane disassembly events including PAD4-mediated chromatin decondensation and nuclear envelope rupture.**
Thiam, H. R., Wong, S. L., Qiu, R., Kittisopikul, M., Vahabikashi, A., Goldman, R. D., Wagner, D. D., Waterman, C. M.
AMER SOC CELL BIOLOGY.2018
 - **Leukocyte Migration and Deformation in Collagen Gels and Microfabricated Constrictions** *CELL MIGRATION*
Saez, P. J., Barbier, L., Attia, R., Thiam, H., Piel, M., Vargas, P.
edited by Gautreau, A.
2018; 1749: 361-373
 - **Study of dendritic cell migration using micro-fabrication** *JOURNAL OF IMMUNOLOGICAL METHODS*
Vargas, P., Chabaud, M., Thiam, H., Lankar, D., Piel, M., Lennon-Dumenil, A.
2016; 432: 30-34
 - **ESCRT III repairs nuclear envelope ruptures during cell migration to limit DNA damage and cell death** *SCIENCE*
Raab, M., Gentili, M., de Belly, H., Thiam, H. R., Vargas, P., Jimenez, A. J., Lautenschlaeger, F., Voituriez, R., Lennon-Dumenil, A. M., Manel, N., Piel, M.
2016; 352 (6283): 359-362

- **Innate control of actin nucleation determines two distinct migration behaviours in dendritic cells (vol 18, pg 43, 2015) *NATURE CELL BIOLOGY***
Vargas, P., Maiuri, P., Bretou, M., Saez, P. J., Pierobon, P., Maurin, M., Chabaud, M., Lankar, D., Obino, D., Terriac, E., Raab, M., Thiam, H., Brocker, et al
2016; 18 (2): 234
- **Innate control of actin nucleation determines two distinct migration behaviours in dendritic cells *NATURE CELL BIOLOGY***
Vargas, P., Maiuri, P., Bretou, M., Saez, P. J., Pierobon, P., Maurin, M., Chabaud, M., Lankar, D., Obino, D., Terriac, E., Raab, M., Thiam, H., Brocker, et al
2016; 18 (1): 43-+
- **Actin Flows Mediate a Universal Coupling between Cell Speed and Cell Persistence *CELL***
Maiuri, P., Rupprecht, J., Wieser, S., Ruprecht, V., Benichou, O., Carpi, N., Coppey, M., De Beco, S., Gov, N., Heisenberg, C., Crespo, C., Lautenschlaeger, F., Le Berre, et al
2015; 161 (2): 374-386
- **A computational mechanics approach to assess the link between cell morphology and forces during confined migration *BIOMECHANICS AND MODELING IN MECHANOBIOLOGY***
Aubry, D., Thiam, H., Piel, M., Allena, R.
2015; 14 (1): 143-157