



Hawa Racine Thiam

Assistant Professor of Bioengineering and of Microbiology and Immunology

Bio

BIO

Hawa Racine Thiam is an Assistant Professor of Bioengineering and Sarafan ChEM-H Institute Scholar at Stanford. Her lab combines microscopy, microfabrication, quantitative Cell Biology and Immunology to investigate the cellular biophysical mechanisms of innate immune cells functions with a particular focus 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 & Immunology
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Institute Scholar, Sarafan ChEM-H

ADMINISTRATIVE APPOINTMENTS

- Investigator, Chan Zuckerberg Biohub, (2022-2027)

HONORS AND AWARDS

- 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, 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

Cellular Biophysical Mechanisms of Innate Immune Cells Functions

Teaching

COURSES

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)

Manish Ayushman, Leslie Chan, Jeanna Enriquez

Postdoctoral Faculty Sponsor

Minwoo Kang, Manasi Sawant

Doctoral Dissertation Advisor (AC)

Aidan Cabral, Ezra Haddad

Undergraduate Major Advisor

Yugendran Rajaendran

Doctoral (Program)

Owen Dunkley

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

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

Publications

PUBLICATIONS

- **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
- **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 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., Lehmann, R.
2020; 36: 191-218
- **Paxillin and tensin1 contribute to focal adhesion disassembly at mitosis to relieve an integrin-inactivation G2-M checkpoint.**
Thiam, H. R., Limon, A., Degaga, E. K., Urbach, J. S., 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., 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
- **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
- **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., Bocker, et al
2016; 18 (1): 43-+
- **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
- **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