

R. Kōnane Bay

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EDUCATION

Ph.D. Polymer Science and Engineering (PSE) 2020
University of Massachusetts Amherst (UMass Amherst), Amherst, MA
Thesis: *Quantifying the Mechanical Properties of Ultrathin Glassy Polymer Films*

M.S. Polymer Science and Engineering 2016
University of Massachusetts Amherst, Amherst, MA

B.S. Materials Engineering, *Magna cum Laude* 2014
Rensselaer Polytechnic Institute (RPI), Troy, NY

RESEARCH AND PROFESSIONAL EXPERIENCE

Assistant Professor, Chemical and Biological Engineering Dept. 08/2022 – Present
University of Colorado Boulder (CU Boulder), Boulder, CO

Presidential Postdoctoral Research Fellow and Postdoctoral Research Associate, Dept. of Chemical and Biological Engineering 07/2020 – 06/2022
Mentor: Prof Sujit Datta, **Princeton University**, Princeton, NJ

Graduate Research Assistant, Polymer Science and Engineering Dept. 09/2015 – 01/2020
Advisor: Prof. Alfred J. Crosby, **UMass Amherst**, Amherst, MA

Guest Researcher, Physical Chemistry and Soft Matter Group 01/2015 – 04/2015
Advisor: Prof. Marleen Kamperman, **Wageningen University**, Wageningen, Netherlands

Research Assistant, Smart Lighting REU & RPI Undergrad Research Prog. 05/2014 – 12/2014
Advisors: Prof. Chaitanya Ullal and Prof. Xing Wang, **RPI**, Troy, NY

Research Assistant, Department of Materials Science and Engineering 09/2013 – 12/2013
Advisor: Prof. Linda Schadler, **RPI**, Troy, NY

Research Assistant, Interfaces and Surfaces REU 05/2013 – 08/2013
Advisor: Prof. Marek Urban, **Clemson University**, Clemson, SC

Research Assistant, MRSEC REU 05/2012 – 08/2012
Advisor: Prof. Zvonimir Dogic, **Brandeis University**, Waltham, MA

HONORS AND AWARDS

Sylvia Norviel Cancer Research Faculty Fellow 2022-2025

Best Poster Award, International Conference on Engineered Living Materials 2022

MIT IMPACT Fellow 2021

Stanford.Berkeley.UCSF Next Generation Faculty Symposium, Honorable Mention 2020

MIT Chemical Engineering Rising Stars Participant 2020

Princeton Presidential Postdoctoral Research Fellowship 2020 – 2022

APS FGSA Travel Award for Excellence in Graduate Research	2020
NSF ASSIST Travel Grant	2020
NSF ACADEME Travel Grant	2020
Frank J. Padden Jr. Award Finalist, American Physical Society (APS)	2020
Lighting the Pathway to Faculty Careers for Natives in STEM Fellowship	2019 – 2021
Eastman Chemical Student Award in Applied Polymer Science	2019
NSF ACADEME Fellowship	2019
GSOFT Travel Award, APS March Meeting	2019
Best Poster Award, Annual Meeting of the Adhesion Society	2019
Spaulding-Smith STEM Dissertation Fellowship, UMass Amherst	2019
NEAGAP/IMSD Fellowship, UMass Amherst	2015 – 2016
Scott Mackay Award, RPI	2015
WE14 Conference Scholarship, RPI Society of Women Engineers (SWE)	2014
Who's Who Among Students in American Universities and Colleges	2014
September Member of the Month, RPI SWE	2013
Outreach Award, RPI SWE	2012, 2013
Tau Beta Pi: Engineering Honors Society	2012
Rensselaer Leadership Award	2011– 2014

PUBLICATIONS (*Denotes equal contributions, +denotes undergraduate researcher)

- [8] X. Xu, N. Guillomaitre, K. Christie, **R.K. Bay**, N. Bizmark, S.S. Datta, Z.J. Ren, R. Priestley, “Quick Release Anti-Fouling Hydrogels for Solar-Driven Water Purification”, *accepted*.
- [7] A. Martínez-Calvo*, T. Bhattacharjee*, **R.K. Bay**, H.N. Luu*, A.M. Hancock, N.S. Wingreen, S.S. Datta, “Morphological instability and roughening of growing 3D bacterial colonies”, *PNAS*, 119, e2208019119 (2022).
- [6] **R.K. Bay**, T. Zhang, S. Shimomura, M. Ilton, K. Tanaka, R.A. Riggleman, A.J. Crosby, “Decoupling the impact of entanglements and mobility on the failure properties of ultrathin polymer films”, *Macromolecules*, **55**(19), 8505-8514 (2022).
- [5] C. Chen, C.A. Airoidi, C.A. Lugo, **R.K. Bay**, B.J. Glover, A.J. Crosby, “Flower Inspiration: Broad-Angle Structural Color Through Tunable Hierarchical Wrinkles in Thin Film Multilayers”, *Advanced Functional Materials*, 2006256 (2021).
- [4] **R.K. Bay***, K. Zarybnicka*, J. Jančář, A.J. Crosby, “Mechanical Properties of Ultrathin Film Nanocomposites”, *ACS Applied Polymer Materials*, **2**(6), 2220-2227, (2020).
- [3] W.J. Choi*, **R.K. Bay***, A.J. Crosby, “Tensile Properties of Ultrathin Bisphenol-A Polycarbonate Films”, *Macromolecules*, **52**(19), 7489-7494, (2019).
- [2] **R.K. Bay**, A.J. Crosby, “Uniaxial Extension of Ultrathin Freestanding Polymer Films”, *ACS Macro Letters*, **8**(9), 1080-1085, (2019).

- [1] **R.K. Bay**, S. Shimomura, Y. Liu, M. Ilton, A.J. Crosby, "Confinement Effect on Strain Localization in Glassy Polymers", *Macromolecules*, **51**(10), 3647-3653 (2018).

INTELLECTUAL PROPERTY

- [1] S. S. Datta, R. D. Priestley, X. Xu, **R. K. Bay**, "Method to 3D-Print Engineered Living Materials", US Provisional Application Filed on 11/4/21.

ARTICLES IN NON-REFEREED PUBLICATIONS

- [3] **R. K. Bay**, A. J. Crosby, "The TUFF Method: Stretching Free-Standing Ultra-Thin Glassy Polymer Films", *Annual Meeting of The Adhesion Society*, Hilton Head, South Carolina, February (2019). [Proceedings]
- [2] **R. K. Bay**, S. Shimomura, M. Ilton, A. J. Crosby, "Deformation Mechanisms in Ultra-thin Glassy Polymer Films", *Deformation, Yield and Fracture of Polymer*, Kerkrade, Netherlands, March (2018). [Proceedings]
- [1] **K. Bay**, S. Boyd, K. Chester, and Peter Lezzi. "RPI Material Advantage Outreach." *Advanced Materials and Processes*, 72, (2014).

INVITED TALKS WHILE AT CU BOULDER

- [16] *Upcoming*: "Impacts of Confinement: From Polymer Films to Bacteria", *Department of Chemical and Biological Engineering, University of New Mexico, Albuquerque, NM, April 2023*.
- [15] *Upcoming*: "Harnessing the Functions of Living Polymeric Materials", *Engineered Living Materials through Synthetic Biology-Beyond the Crossroad of Biology and Chemistry, American Chemical Society National Meeting, Indianapolis, IN, March 2023*.
- [14] "Impacts of Confinement: From Polymer Films to Bacteria", *Department of Chemical and Biological Engineering, Colorado State University, Fort Collins, CO, October 2022*.

INVITED TALKS PRIOR TO CU BOULDER

- [13] "Quantifying the Mechanics of Ultrathin Polymer Films", *Department of Materials Science and Engineering, Massachusetts Institute of Technology, March 2021*.
- [12] "Quantifying the Mechanics of Ultrathin Polymer Films", *Department of Chemical and Biological Engineering, University of Colorado Boulder, January 2021*.
- [11] "Quantifying the Mechanics of Ultrathin Polymer Films", *Department of Materials Science and Engineering, Carnegie Mellon University, January 2021*.
- [10] "What controls failure in ultrathin polymer films?", *National ChemE Seminar Series*, <https://bit.ly/2lqJEkb>, November 2020.
- [9] "What controls failure in ultrathin polymer films?", *Soft Matter for All Symposium, MRSEC of Princeton University and University of Delaware, October 2020*.
- [8] *Condensed Matter Seminar series, Tufts University, Somerville, MA, April 2020*. (Cancelled due to COVID-19)

- [7] “Decoupling the Role of Entanglements and Mobility in the Mechanics of Ultrathin Polymer Glasses”, *DPOLY Virtual Padden Symposium, March Meeting of the APS*, March 2020. **Finalist**
- [6] “Directly Measuring the Uniaxial Stress-Strain Response of Freestanding Ultra-Thin Glassy Polymer Films”, *Eastman Chemical Student Award Symposium, 257th American Chemical Society National Meeting*, San Diego, CA, August 2019. **Awarded**
- [5] “Deformation and Failure Mechanisms of Ultra-Thin Polymer Films”, *Soft Materials Coffee Hour, Princeton University*, Princeton, NJ, July 2019.
- [4] “Quantifying the Mechanical Properties of Ultra-Thin Glassy Polymer Films”, *Polymer Science – Zernike Institute for Advanced Materials, University of Groningen*, Groningen, Netherlands, Jan. 2019.
- [3] “Quantifying the Mechanical Properties of Ultra-Thin Glassy Polymer Films”, *Lindner and du Roure Group Meeting, ESPCI*, Paris, France, January 2019.
- [2] “Quantifying the Mechanical Properties of Ultra-Thin Glassy Polymer Films”, *Polymer Physics Gordon Research Seminar*, South Hadley, MA, July 2018.
- [1] “Deformation Mechanisms in Ultra-Thin Glassy Polymer Films.” *Department of Material Science and Engineering, Rensselaer Polytechnic Institute*, Troy, NY, September 2017.

CONTRIBUTED ORAL PRESENTATIONS

- [9] **R.K. Bay**, H.N. Luu, S.S. Datta, “Escaping Confinement: How Bacteria Reshape Their Surroundings to Enable Migration” *March Meeting of the APS*, Chicago, IL, Mar. 2021.
- [8] **R.K. Bay**, S.S. Datta, “Biofilm Growth Morphology in Confined Heterogeneous Media” *American Institute of Chemical Engineers Annual Meeting*, Boston, MA, Nov. 2021.
- [7] **R.K. Bay**, A.J. Crosby, “What controls failure in ultrathin glassy polymer films?” *March Meeting of the APS*, Virtual, March 2021.
- [6] **R.K. Bay**, A.J. Crosby, “Uniaxial Extension of Ultra-Thin Freestanding Polymer Films”, *Materials Research Society*, Boston, MA, December 2019.
- [5] **R.K. Bay**, A.J. Crosby, “How do ultra-thin polymer films fail?”, *Center for UMass/Industry Research on Polymers (CUMIRP)*, Amherst, MA, October 2019.
- [4] **R.K. Bay**, A.J. Crosby, “The TUFF Method: Stretching Free-Standing Ultra-Thin Glassy Polymer Films”, *March Meeting of the APS*, Boston, MA, March 2019.
- [3] **R.K. Bay**, S. Shimomura, M. Ilton, A.J. Crosby, “Quantifying the Mechanical Properties of Ultra-Thin Glassy Polymer Films”, *NEW.Mech*, Providence, RI, September 2018. (Sound Bite)
- [2] **R.K. Bay**, S. Shimomura, M. Ilton, A.J. Crosby, “How Do Ultra-Thin Glassy Polymers Fail?”, *March Meeting of the APS*, Los Angeles, CA, March 2018.
- [1] **R.K. Bay**, S. Shimomura, Y. Liu, M. Ilton, A.J. Crosby, “Thickness Dependence on Failure in Ultra-Thin Glassy Polymers”, *March Meeting of the APS*, New Orleans, LA, March 2017.

POSTER PRESENTATIONS

- [17] **R.K. Bay**, S.S. Datta, "3D Printing Bacteria: Growth in Confined Environments to Material Fabrication", *Gordon Research Conference on Polymer Physics*, South Hadley, MA, July 2022.
- [16] **R.K. Bay**, S.S. Datta, "3D Printing Bacteria: Growth in Confined Environments to Material Fabrication", *International Conference on Engineered Living Materials*, Saarbürken, Germany, June 2022. **Best Poster Award**
- [15] **R.K. Bay**, S.S. Datta, "3D Printing Bacteria: Growth in Confined Environments to Material Fabrication", *TOSOH Polymer Conference*, Hollywood, CA, June 2022.
- [14] **R.K. Bay**, K. Zarybnicka, J. Jančář, A.J. Crosby, "Unfolding of Polymer Thin Films on Liquid Surfaces", *March Meeting of the APS*, Virtual, March 2021.
- [13] **R. K. Bay**, A. J. Crosby, "The TUFF Method: Stretching Free-Standing Ultra-Thin Glassy Polymer Films", *MIT Polymer Day*, Cambridge, MA, April 2019.
- [12] **R. K. Bay**, A. J. Crosby, "The TUFF Method: Stretching Free-Standing Ultra-Thin Glassy Polymer Films", *Annual Meeting of The Adhesion Society*, Hilton Head, SC, February 2019. **Best Poster Award**
- [11] **R. K. Bay**, A. J. Crosby, "Quantifying the Mechanical Properties of Ultra-Thin Glassy Polymer Films", *CUMIRP*, Amherst, MA, October 2018.
- [10] **R. K. Bay**, W.J. Choi, S. Shimomura, M. Ilton, A. J. Crosby, "Quantifying the Mechanical Properties of Ultra-Thin Glassy Polymer Films", *Gordon Research Conference on Polymer Physics*, South Hadley, MA, July 2018.
- [9] **R. K. Bay**, S. Shimomura, M. Ilton, A. J. Crosby, "Deformation Mechanisms in Ultra-thin Glassy Polymer Films", *CUMIRP*, Amherst, MA, May 2018.
- [8] **R. K. Bay**, S. Shimomura, M. Ilton, A. J. Crosby, "Deformation Mechanisms in Ultra-thin Glassy Polymer Films", *Deformation, Yield, and Fracture of Polymer*, Kerkade, Netherlands, Mar. 2018.
- [7] **R. K. Bay**, S. Shimomura, Y. Liu, M. Ilton, A. J. Crosby, "Thickness Dependence on Failure in Ultra-Thin Glassy Polymers", *CUMIRP*, Amherst, MA, October 2017.
- [6] **R. K. Bay**, S. Shimomura, Y. Liu, M. Ilton, A. J. Crosby, "Thickness Dependence on Failure in Ultra-Thin Glassy Polymers", *MIT Polymers Day*, Cambridge, MA, April 2017.
- [5] **R. K. Bay**, S. Shimomura, Y. Liu, M. Ilton, A. J. Crosby, "Quantifying the Polymer Physics of Mechanical Deformation in Ultra-thin Polymer Glasses", *CUMIRP*, Amherst, MA, Oct. 2016.
- [4] **R. K. Bay**, X. Wang, Chaitanya Ullal, "DNA Templated 3D Nanostructures for Compact Secondary Optics", *Smart Lighting ERC and CURENT ERC REU*, Troy, NY, July 2014.
- [3] **R. K. Bay**, Y. Yang, M.W. Urban, "Dynamic Simulations of Self-healing Polymers", *Materials Science and Technology*, Montreal, Canada, October 2013.
- [2] **R. K. Bay**, Y. Yang, M.W. Urban, "Dynamic Simulations of Self-healing Polymers", *2013 Research Experience for Undergraduates Poster Symposium*, Clemson, SC, August 2013.

- [1] **R. K. Bay**, P. Sharma, G. Zilberberg, Z. Dogic, “Micro-phase Separation in Bi-Disperse Colloidal Membranes”, *Division of Science Undergraduate Poster Session*, Waltham, MA, August 2012.

PROFESSIONAL MEMBERSHIP

American Physical Society (APS)
 American Chemical Society (ACS)
 American Indian Science and Engineering Society (AISES)
 American Institute of Chemical Engineers (AIChE)
 Society of Indigenous Physicists (SIP)

PROFESSIONAL ACTIVITIES AND SERVICE

For the Professional Community

Ad hoc Peer Reviewer	<i>Nature Communications, Science Advances, ACS Nano, ACS Polymers Au, ACS Macro Letters, Macromolecules, Soft Matter, Polymer</i>	
Participant	NSF Workshop on Materials Laboratories of the Future: Instrumentation and Infrastructure to Accelerate the Unification of the Materials Innovations Infrastructure: Soft Matter, Polymers, and Biomaterials	2022
Founder	Polymer Assistant Professor Slack	2022
Reviewer	ACS PMSE Student Award	2022
Chair	Polymer Physics Gordon Research Seminar	2022
Discussion Leader	Tosoh Polymer Conference	2022
Invited Participant & Scribe	NCI-NSF Living Materials Square Table Meeting	2021
Co-founder	Early Career Researchers in Polymer Physics Slack	2020
Co-organizer	Virtual Polymer Physics Symposium	2020

For the University/Department

Member	Chemical and Biological Engineering Faculty Search Committee	2022 – Present
Member	Chemical and Biological Engineering Faculty Committee	2022 – Present
Co-coordinator	Soft Materials Coffee Hour (SMatCH) at Princeton	2020 – 2021
Coordinator	PSE Undergraduate Researcher Seminar	2018
Member	PSE Mentoring Committee	2016 – 2017

Community Outreach

Organizer/Presenter	“Failure is an Option: How to Design & Engineer Materials” at 2022 AISES National Conference	2022
Volunteer	Princeton Holiday Lecture	2020
Organizer/Presenter	“It’s a Material World: Materials Science & You!” at 2020 AISES National Conference	2020
Outreach Coordinator & Volunteer	Crosby Group, PSE Dept., PSE ASPIRE	2015 – 2019

TEACHING

At CU Boulder (*denotes co-taught)

- Fall 2022: *CHEN 3320 Chemical Engineering Thermodynamics**

Prior to CU Boulder

Guest Lecturer	Squishy Engineering-Using Soft Materials to Solve Hard Problems	Fall 2021
Trainee	Teaching Transcript Program at Princeton University	2020 – 2022
Teaching Assistant	Introduction to Polymer Science and Engineering	Spring 2018

STUDENT ADVISING

Graduate Students:

Student	Department/Program	Thesis Type	Period
Samson Adelani	Materials Science and Eng.	Ph.D.	01/2023 – Present
Nickolas Gibson	Biological Engineering	Ph.D.	01/2023 – Present
Ava Crowley	Chemical Engineering	Ph.D.	01/2023 – Present

Undergraduate Students

Student	Department/Program	School	Period
Teagan Kelly	Chemical Engineering	CU Boulder	01/2023 – Present
Lydia Flackett	Chemical Engineering	CU Boulder	01/2023 – Present
Nicole Garza	Chemical Engineering	CU Boulder	01/2023 – Present
Hao Nghi Luu	Chemical Engineering	Princeton	08/2021 – 05/2022

Courtney Guertin	Chemical Engineering	UMass	09/2018 – 01/2019
Alexander Hamer	Chemical Engineering	UMass	06/2017 – 06/2019

Ph.D. Committees (not chair)

Student	Department/Program	Thesis type	Period
Gregory Donovan	Chemical Engineering	PhD	10/2022 – Present
Hayden Fowler	Chemical Engineering	PhD	10/2022 – Present
Alexis Phillips	Chemical Engineering	PhD	10/2022 – Present
Maria Kelly	Chemical Engineering	PhD	10/2022 – Present
Karan Dikshit	Materials Science and Eng.	PhD	07/2021 – 07/2022