02/16/24

**Tamara Carla Bidone, Ph.D.**

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# EDUCATION

2016-2018 Postdoctoral research associate, University of Chicago

2013-2016 Postdoctoral research associate, Lehigh University

2013 PhD in Biomedical Engineering, Polytechnic University of Turin, Italy

2008 MS in Biomedical Engineering, Polytechnic University of Turin, Italy

2006 BS in Biomedical Engineering, Polytechnic University of Turin, Italy

# PROFESSIONAL AND ACADEMIC APPOINTMENTS

2019-present Assistant Professor of Biomedical Engineering, University of Utah

2019-present Adjunct Assistant Professor of Molecular Pharmaceutics, University of Utah

2020-present Adjunct Assistant Professor at the School of Computing, University of Utah

2021-present Adjunct Assistant Professor of Biochemistry, University of Utah

2012 Visiting PhD student, Gordon Center for Integrative Science, University of Chicago

2012 Visiting PhD student, University of Zaragoza

2011-2012 Visiting PhD student, Mechanobiology Department, MIT

# AWARDS AND HONORS

2024 Selected for 34th Symposium *Kavli Frontiers of Science* by the National Academy of Science

2024 Selected for 2024 Symposium *Best of Biophysical Journal: Molecules to Health*

2023 Nominated by the NIH *System Biology Community*

2013 NSF scholarship for research at the Marine Biology Laboratory, Woods Hole, MA

2010-2011 Recipient of the MITOR scholarship for research at MIT

2010 Recipient of the European Inter-polytechnic Schools of Engineering scholarship

2010 Best Student Poster Award, American Society of Mechanical Engineering

2008 BBRAUN: 1st prize, national level; 3rd prize, international level

# PUBLICATIONS

Citations: 665

h-index (Google Scholar): 13

i10-index (Google Scholar):15

Thesis/Dissertation

Computational Study of Actin: Mechanics of Actin Filaments, Rheology of Actin Networks and Buildup of Force in Contractile Actin Assemblies. 2013, PhD Dissertation, Polytechnic of Turin, Italy

Refereed Journal Articles (\*Corresponding author)

1. Siva Dasetti, Tamara C Bidone, Andrew J. Ferguson\*, “[*Data-driven prediction of αIIbβ3 integrin activation pathways using nonlinear manifold learning and deep generative modeling*](https://www.cell.com/biophysj/pdf/S0006-3495(23)04129-2.pdf)” , Biophysical Journal (2023)
2. Keith R. Carney, Akib M. Khan, Samantha Stam,Shiela C. Samson, Nikhil Mittal, Sangyoon J. Han, Tamara C. Bidone, and Michelle C. Mendoza\*, “*Nascent adhesions shorten the period of lamellipodium protrusion through the Brownian ratchet mechanism*”, Molecular Biology of the Cell (2023)
3. Valeriia Grudtsyna, Swathi Packirisamy, Tamara Bidone, Vinay Swaminathan\*, “*Extracellular matrix sensing via modulation of orientational order of integrins and F-actin in focal adhesions*”*,* Life Science Alliance (2023)
4. Samuel Campbell, Michelle Mendoza, Aravind Rammohan, Matthew E. McKenzie, Tamara C. Bidone\* “*Computational model of integrin adhesion elongation under an actin fiber*”, *Plos* Computational Biology (2023)
5. RD Rabbitt\*, TC Bidone , “[A parametric blueprint for optimum cochlear outer hair cell design](https://scholar.google.com/citations?view_op=view_citation&hl=en&user=xdW1xscAAAAJ&sortby=pubdate&citation_for_view=xdW1xscAAAAJ:j3f4tGmQtD8C)”. Journal of the Royal Society Interface 20 (199), 20220762
6. Tamara C Bidone\*, David Odde. “*Multiscale modeling of integrins and cellular adhesions*”, Current Opinion in Structural Biology (2023)
7. Dudu Tong, Nidhi Soley, Reza Kolasangiani, Martin Schwartz, Tamara C. Bidone\* “*AlphaIIBbeta3 integrin intermediates: from molecular dynamics to adhesion assembly*”, *Biophysical Journal* (2023)
8. Reza Kolasangiani, Tamara C. Bidone, Martin Schwartz\* “*Integrin conformational dynamics and mechanotransduction*”, Cells(2022)
9. Yang Chen, Julia Brasch, Oliver J. Harrison, Tamara C. Bidone\* “*Computational model of E-cadherin clustering under force*”, Biophysical Journal (2021)
10. Tristan Driscoll\*, Tamara C. Bidone\*, Sang Joon Ahn, Alvin Yu,Alexander Groisman, Gregory A. Voth, and Martin A. Schwartz “*Integrin-based mechanosensing through conformational deformation*”, Biophysical Journal (2021)
11. Kaitlin E. Homa, Vilmos Zsolnay, Caitlin A. Anderson, Meghan E. O’Connell, Erin M. Neidt, Gregory A. Voth, Tamara C. Bidone\* and David R. Kovar\* “*Formin Cdc12’s specific actin assembly properties are tailored for cytokinesis in fission yeast*”, Biophysical Journal (2021)
12. S. Campbell, M. Amin, D. Varma, T.C. Bidone\*. “*Computational model demonstrates that Ndc80-associated proteins strengthen kinetochore-microtubule attachments in metaphase*”, Cytoskeleton (2019)
13. Tamara C Bidone, Austin Skeeter, Patrick Oakes, Gregory A Voth\*. “*Multiscale model of integrin adhesion assembly*”, Plos Computational Biology (2019)
14. Bidone T.C., Polley A., J Jin, T. Driscoll, D.V Iwamoto, D. Caldewood, Schwartz M., Voth G.\*, “*Coarse grained simulation of full-length integrin activation*”, Biophysical Journal (2019)
15. A. J. Harker, H.H. Katkar, T.C. Bidone, F. Aydin, G.A. Voth, D. Kovar\*. “*Ena/VASP processive elongation is modulated by avidity on actin filaments bundled by the filopodia crosslinker fascin*”. Molecular Biology of the Cell (2019)
16. Patrick Oakes\*, Tamara C. Bidone, Yvonne Beckham, Austin V. Skeeters, Guillermina R. Ramirez-San Juan, Gregory A. Voth, Margaret Gardel\*. “*The lamellipodium is a myosin independent mechanosensor*”, PNAS (2018)
17. Tamara C Bidone, W. Jung, D. Maruri, C. Burau, R.D. Kamm\*, T Kim\*. “*Morphological transformation and force generation of active cytoskeletal networks*”, Plos Computational Biology (2017)
18. Dan Zhang, Tamara C. Bidone, Dimitrios Vavylonis\*, “*The cortical ER regulates actomyosin ring assembly through ER-PM contacts*”, Current Biology (2016)
19. Tamara C. Bidone. Haosu Tang, Dimitrios Vavylonis\*, “*Dynamic network morphology and tension buildup in 3D model of cytokinetic ring assembly*”, Biophysical Journal (2014)
20. Tamara C. Bidone, Taeyoon Kim, Marco A. Deriu, Umberto Morbiducci, Roger D. Kamm\*, “*Multiscale impact of nucleotides and cations on the conformational equilibrium, elasticity and rheology of actin filaments and crosslinked networks*”, Biomechanics and Modeling in Mechanobiology (2014)
21. Carlos Borau, Taeyoon Kim, Tamara C. Bidone, José Manuel García-Aznar, Roger D. Kamm\*, “*Dynamic mechanisms of cell rigidity sensing: insights from a computational model of actomyosin networks*”, PLoS ONE 7(11): e49174. doi: 10.1371/journal.pone.0049174.
22. Deriu\* M.A., Shkurti A., Paciello G., Bidone T.C., Morbiducci U., Ficarra E., Audenino A., Acquaviva A., “*Multiscale Modelling of Cellular Actin Filaments: From Atomistic to Molecular to Coarse Grained Dynamics*”, Proteins, Bertrand Garcia-Moreno, pp. 12, 2012, ISSN: 1097-0134.
23. Deriu\* M.A., Bidone T.C., Mastrangelo F., Di Benedetto G., Soncini M., Montevecchi F.M., Morbiducci U., “*Biomechanics of actin filaments: a computational multi-level study*”, Journal of Biomechanics, Elsevier, pp. 7, 2011, Vol. 44, ISSN: 0021-9290, DOI: 10.1016/j.jbiomech.2010.11.014.

# INVITED DEPARTMENT SEMINARS, CONFERENCES AND WORKSHOP TALKS (since 2019)

* Invited talk at the System Biology Scientific Interest Group, US National Institute of Health, Bethesda, MD, January 23rd, 2024.
* Invited talk at Computational Oncology Research Initiative (CORI) Seminar Series, virtual presentation by Zoom, November 11th, 2023.
* Invited talk at 2023 *Tissue, Matrix, and Pathology*. By the American Society for Matrix Biology. Salt Lake City, Utah, October 22-25, 2023.
* Invited talk at 2023 *Rocky Mountain Regional Meeting*. Laramie, Wyoming, September 15-17, 2023.
* Invited department seminar: Biomedical Sciences, University of Italian Switzerland, Lugano, CH, June 9, 2023
* Invited lecture at 2023 *Visualizing Membrane/Protein Interactions*. A Practical Approach to Analyzing Simulations and Experiments. Paris, FR. June 5-7, 2023
* Invited lecture at 2022 *International School of Statistical Physics*. Erice School: Exploring and Quantifying Rough Free Energy Landscapes, Ettore Majorana Foundation and Center for Scientific Culture, Erice, Italy. September 26-30, 2022
* Podium presentation at the *Bioscience Symposium*. Biological Chemistry Program, University of Utah, September 13, 2022
* Invited department seminar: Biomedical engineering seminar, North Carolina Agricultural & Technical State University, Greensboro, September 8, 2022
* Invited talk at 2022 Cytoskeletal Motors, *Molecular Machines: from Biophysics to Physiology to Disease.* Gordon Research Conference. West Dover, VT, July 10-15, 2022
* Invited talk at *2022 Biological Membranes and Membrane Proteins: Challenges for Theory and Experiments.* Santa Fe, New Mexico. June 19-24, 2022
* Invited talk at *Biophysics at the dawn of exascale computers*. Hamburg, Germany, May 16-20, 2022
* Invited department seminar: *Research in Progress Session in Biochemistry*, University of Utah, June 3, 2021
* Invited department seminar: *Pharmaceutics and Pharmaceutical Chemistry Seminar Series*, University of Utah, February 22, 2021
* Invited department seminar: *Huntsman Cancer Institute Seminar Series*, University of Utah, September 23, 2020
* Invited department seminar: *Mathematical Biology Seminars*, University of Utah, September 25, 2019
* Selected talk at the Thematic Meeting *Biology and Physics Confront Cell-Cell Adhesions*, Aussois, France, October 14-17, 2019
* Podium presentation at the mid-winter meeting of the Association for Research in Otolaryngology, San Diego, January 25-29, 2020
* Invited talk at *Mathematics and Computer Science in Modeling and Understanding of Structure and Dynamics of Biomolecules*, Banff International Research Station for Mathematics Innovation and Discovery, August 9-11, 2019
* Invited talk at the *International Conference on Mathematical Multiscale Modeling in Biology*, Guanacaste, Costa Rica, October 21-29, 2019
* Invited talk at *Biological Membranes and Membrane Proteins*, Santa Fe, New Mexico, June 10-13, 2019

# TEACHING

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| Spring 2024 | | Computational Methods for Biomedical Engineering (BIOEN 3301), University of Utah (co-taught with Dr. Ellis) | |
| Fall 2023 | | Molecular Biophysics (BIOEN 6002) Biomedical Engineering, University of Utah | |
| Spring 2023 | | Computational Methods for Biomedical Engineering (BIOEN 3301), University of Utah (co-taught with Dr. Ellis) | |
| Spring 2023 | | Capstone exam facilitator, (MBIOL 6300-01), Molecular Biology Program, University of Utah (co-taught with Jaclyn Winter) | |
| Fall 2022 | | Bioengineering Thesis Writing and Communication II (BIOEN 4992),  Biomedical Engineering, University of Utah (co-taught with Dr. Kubanek, Dr. Joshi, Dr. Grainger, Dr. Palmer, Dr. Dorval and Dr. Hitchcock) | |
| Fall 2022 | | Molecular Biophysics (BIOEN 6002) Biomedical Engineering, University of Utah (co-taught with Dr. Hlady) | |
| Spring 2022 | | Computational Methods for Biomedical Engineering (BIOEN 3301), University of Utah (co-taught with Dr. Ellis) | |
| Fall 2021 | | Molecular Biophysics (BIOEN 6002) Biomedical Engineering, University of Utah (co-taught with Dr. Hlady) | |
| Spring 2021 | | Computational Methods for Biomedical Engineering (BIOEN 3301), University of Utah (co-taught with Dr. Ellis) | |
| Fall 2020 | | Molecular Biophysics (BIOEN 6002) Biomedical Engineering, University of Utah (co-taught with Dr. Hlady) | |
| Spring 2020 | | Computational Methods for Biomedical Engineering (BIOEN 3301), University of Utah (co-taught with Dr. Ellis) | |
| Fall 2019 |  | Molecular Biophysics (BIOEN 6002) Biomedical Engineering, University of Utah (co-taught with Dr. Hlady) |
| Fall 2019 |  | Bioengineering Thesis Writing and Communication II (BIOEN 4992),  Biomedical Engineering, University of Utah (co-taught with Dr. Bock, Dr. Broadhead, Dr. Kramer, Dr. Grainger, Dr. Palmer and Dr. Sachse) |
| Spring 2015 |  | Introduction to Computational Physics (PHY 380), Department of Physics, Lehigh University |

**TRAINEES**

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| **Postdoctoral fellows** |  |
| Tomasz Skora, PhD | Postdoctoral research associate, University of Utah, 2023-present |
| Robert Coffman, PhD | Postdoctoral research associate, University of Utah, 2022-present |
| **Software developers** |  |
| Keith Carney | Huntsman Cancer Institute and Scientific Computing and Imaging Institute, University of Utah, 2022-present |
| **Graduate students – Current** |  |
| Reza Kolasangiani | PhD student, Biomedical Engineering, University of Utah, 2021- |
| Onkar Joshi | PhD student, Biomedical Engineering, University of Utah, 2022- |
| Remi Sondaz | PhD student, Biomedical Engineering, University of Utah, 2022- |
| **Undergraduate students – Current** |  |
| Anna Igorevna, Yarema | Undergraduate student, Biomedical Engineering, University of Utah, 2021- |
| **Graduate students – Alumni** |  |
| Nidhi Soley | MS student, Biomedical Engineering, University of Utah, 2020-2022 |
| Yang Chen | MS student, Biomedical Engineering, University of Utah, 2019-2021 |
| **Postdoctoral fellows – Alumni** |  |
| Dudu Tong, PhD | Postdoctoral research associate, University of Utah, 2021-2022 |

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| **Graduate student committees – Current** |  |
| Cameron Jacobson | PhD student, Biomedical Engineering, University of Utah, 2023- |
| James Craig | MS student, Biomedical Engineering, University of Utah, 2023- |
| Grange Simpson | MS student, Biomedical Engineering, University of Utah, 2023- |
| Will Foreman | PhD student, Biochemistry, University of Utah, 2023- |
| Pooja Rao | PhD student, Chemistry, University of Utah, 2022- |
| Sara Hoppe | PhD student, Biochemistry, University of Utah, 2022- |
| Robert Falconer | PhD student, Biomedical Engineering, University of Utah, 2022- |
| Farhan Muhib | PhD student, Biomedical Engineering, University of Utah, 2022- |
| Alexandra Richey | PhD student, Biomedical Engineering, University of Utah, 2021- |
| Shad Dinkins | PhD student, Biomedical Engineering, University of Utah, 2021- |
| Rajat Kumar | PhD student, Chemistry, University of Utah, 2021- |
| Tyler Southam | PhD student, Chemistry, University of Utah, 2021- |
| Ryan Spencer | PhD student, Chemistry, University of Utah, 2021- |
| Annika Hylen | PhD student, Biomedical Engineering, University of Utah, 2020- |
| Jason Grunberger | PhD student, Molecular Pharmaceutics, University of Utah, 2020- |
| Erica Hastings | PhD student, Biochemistry, University of Utah, 2020- |
| Caleb Berggren | PhD student, Biomedical Engineering, University of Utah, 2019- |
| Matthew Bradley | PhD student, Biomedical Engineering, University of Utah, 2018- |
| Janet Mante | PhD student, Biomedical Engineering, University of Utah, 2018- |
| **Graduate students Committees – Alumni** |  |
| Rebecca Goldstein Zitnay | PhD student, Biomedical Engineering, University of Utah, 2014-2023 |
| Amanda Lematty | MS student, Biomedical Engineering, University of Utah, 2022-2024 |
| Acramul Kabir | MS student, Biomedical Engineering, University of Utah, 2021-2023 |
| Josh Jackson | MS student, Biomedical Engineering, University of Utah, 2018-2023 |
| Pedro Fontanarossa | PhD student, Biomedical Engineering, University of  Utah, 2017-2022 |
| Emma Patterson | MS student, Biomedical Engineering, University of Utah, 2020-2022 |
| **Undergraduate students – Alumni** |  |
| Payton Thomas | Undergraduate student, Biomedical Engineering, University of Utah, 2019-2023 |
| Samuel Campbell | Undergraduate student, Biomedical Engineering, University of Utah, 2018-2022 |
| Jashan Sandhu | Undergraduate student, Biomedical Engineering, University of Utah, 2019-2021 |
| William Garrett | Undergraduate student, Biomedical Engineering, University of Utah, 2019-2020 |
| Andrew Cleveland | Undergraduate student, Biomedical Engineering, University of Utah, 2019-2021 |
| Rebecca Urban | Undergraduate student, Biomedical Engineering, University of Utah, 2020-2022 |
| Alex Fritz | Undergraduate student, School of Computing, University of Utah, 2019-2021 |

# SERVICE

# Manuscript reviews

Advanced Science (x1 paper), 2024

Biophysical Journal (x7 papers), 2018-2024

Communication Biology (x1 paper), 2023

Communication Materials (x2 paper), 2023

Cytoskeleton (x4 paper), 2019-2024

Journal of Applied Physics (x1 paper), 2023

Journal of Biological Chemistry *(*x2 paper), 2022-2023

Journal of Biological Physics (x1 paper), 2019

Journal of Biomechanics (x1 paper), 2018

Journal of Chemical Information and Modeling (x1 paper), 2023

Matrix Biology (x1 paper), 2023

Nature Communications (x3 papers), 2021-2024

Plos Computational Biology (x8 papers), 2019-2024

PNAS (x2 paper), 2022-2024

Molecular Simulations (x1 paper), 2021

Molecular Biology of the Cell (x4 papers), 2019-2022

Royal Society Open Science (x1 paper), 2021

Science Advances (x1 paper), 2024

# Reviews and Editorial Duties

Ad-hoc reviewer (Temporary Member), NIH MABS Study Section, 02/2024

Ad-hoc reviewer (Temporary Member), NIH MSFA Study Section, 10/2023

Review Editor, Frontiers in Molecular Biosciences, specialty section *Biological Modeling and Simulations*, 2023-2024

Guest Editor, International Journal of Molecular Sciences, Special Issue *Computational Modeling and Molecular Dynamics Simulations of Biological Systems*, 09/2023

External Referee, Human Frontier Science Program Organization, 11/2022

Grant Review Panelist, National Science Foundation, Biomechanics and Mechanobiology (BMMB) Study Section, 09/2021

Grant Reviewer, Biotechnology and Biological Sciences Research Council (BRRC), 02/2020

**Organization and Chairing at Scientific Meetings**

Chair of the Gordon Research Seminar on Proteins, June 15-16, 2019, NH

# Committee Membership

Member, Faculty Search Committee, Cardiovascular Engineering, Department of Biomedical Engineering, University of Utah, 2024

Member, Faculty Search Committee, Computational Oncology, Scientific Computing and Imaging Institute, University of Utah, 2024

Member, Molecular Biological and Biological Chemistry Programs, Biochemistry, University of Utah, 2022-

Member, Faculty Search Committee, Scientific Computing and Imaging Institute, University of Utah, 2022

Member, Graduate Admission Committee, Biomedical Engineering, University of Utah, 2019-

Co-chair, Data Science and Computation Track, Biomedical Engineering, University of Utah, 2019-

# SOCIETIES

American Chemical Society, since 2022 (member)

American Society for Matrix Biology, since 2023 (member)

Biophysical Society, since 2013 (member)

American Society for Cell Biology, since 2013 (member)

American Society of Mechanical Engineering, since 2010 (member)

Association for Research in Otolaryngology, 2019-2020

# GRANTS

**Current grants**

Title: *Computational Models of Cell Mechanosensing Through Integrin-Based Adhesions*

Organization: National Institute of Health (NIGMS MIRA R35 GM147491-01)

Impact score: 20

Role in Project: Principal Investigator

Total grant: $1,906,250

Tamara Bidone portion: $1,906,250

Dates: 09/01/2022 to 08/31/2027

Title: *Multiscale Computational Framework for Biomolecular Energy Transduction: from Electrons to the Mesoscale*

Organization: Department of Defense (BES-CCS)

Role in Project: co-PI (with Gregory Voth, University of Chicago)

Total grant $: 2,475,000

Tamara Bidone portion $: 329,367

Dates: 09/01/2022 to 08/31/2025

Title: *Regulation of Cell Adhesions by Mechanical Force*

Organization: National Science Foundation (Award Number: 2044394)

Role in Project: Principal Investigator

Total grant $: 386,319

Tamara Bidone portion $: 215,288

Dates: 04/01/2021 to 03/31/2024

**Pending**

Title: *Collaborative proposal: Exploring the interplay of curvotaxis and durotaxis in corneal stromal cells: An experimental and computational approach*

Organization: National Science Foundation

Role in Project: co-PI (with J. Jungkyu)

Total grant $: 652,786

Tamara Bidone portion $: 263,930

Dates: 04/07/2024 to 06/30/2027

Title: *Arteriogenesis in Translation (ARTIS)*

Organization: Leducq Foundation

Role in Project: co-PI (with M. Schwartz, C. Ruhrberg, B. Kholodenko, O. Rukhlenko, M. Simons, E. Tzima, B. Hannex, C. Chen, M. Rudnick)

Total grant $: 6,144,900

Tamara Bidone portion $: 362,930

Dates: 09/01/2024 to 08/31/2029

Title: *Interdisciplinary team building to unlock the secrets of hemozoin motion in malaria parasites*

Organization: The Immunology, Inflammation, and Infectious Disease Initiative (3i) Seed Grant, University of Utah,

Role in Project: co-PI (with P. Sigala, H. Fu)

Total grant $: 50,000

Tamara Bidone portion $: 20,000

Dates: 06/01/2024 to 05/31/2025

**Past grants**

Title: *Understanding the Physical Forces of Oncogene-Driven Cancer Migration and Invasion*

Organization: Huntsman Cancer Institute, University of Utah (Computational Oncology Research Initiative, CORI)

Role in Project: Principal Investigator

Total grant $: 50,000

Tamara Bidone portion $: 25,000

Dates: 01/01/2021 to 12/31/2022

Title: *Combining Modeling with Experiments for the Study of Cell Mechanosensing*

Organization: University of Utah (1U4U initiative)

Role in Project: Principal Investigator

Total grant $: 30,000

Tamara Bidone portion $: 10,000

Dates: 01/03/2020 to 12/31/2021