

Curriculum Vitae of  
Toni-Marie Achilli

**Name, Position,  
Department**

Toni-Marie Achilli  
Lecturer  
Department of Molecular Pharmacology, Physiology, and Biotechnology  
Brown University  
Providence, RI 02912

**Education**

**PhD, Biomedical Engineering** *May, 2014*  
**Brown University**, Providence, RI  
*Thesis Title: Quantifying Uptake, Transport, and Elimination in 3D Self-Assembled Microtissues*  
GPA 4.0/4.0

**BS, Chemical and Biomolecular Engineering**, *May, 2008*  
**The Johns Hopkins University**, Baltimore, MD  
GPA 3.3/4.0

**Educational Awards and Associations:**

- Research featured as 1 of the top 10 medical breakthroughs of 2010 by Time Magazine (artificial ovary)
- Awarded best poster presentation at International Conference on Frontiers in Pharmaceutical Sciences
- Dean's List
- June R. Levy Fellowship
- Biomedical Engineering Society

**Professional  
Appointments**

**Associate Dean for Biology Undergraduate Education**, Brown University, Providence, RI  
Biology Education  
September 2022 - Present

**Lecturer**, Brown University, Providence, RI  
Biology Education, formerly Molecular Pharmacology, Physiology, and Biotechnology  
July 2017-Present

**Assistant Dean for Biology Undergraduate Education**, Brown University, Providence, RI  
Biology Education  
July 2021-September 2022

**Adjunct Professor**, Rhode Island College, Providence, RI  
Biology Department  
September 2017- June 2021

**Director of Industry Outreach**, Brown University, Providence, RI  
Biotechnology  
March 2019-June 2021

**Interim Master's Program Director**, Brown University, Providence, RI  
Biotechnology  
March 2018-July 2018

**Assistant Professor**, RI INBRE Teaching Post-doc, Rhode Island College, Providence, RI  
Biology Department

September 2014-July 2017

**Adjunct Professor**, Community College of Rhode Island, Warwick and Lincoln, RI  
Biology Department  
September 2013-September 201

## Teaching

**Lecturer**, Brown University, Providence, RI  
Department of Molecular Pharmacology, Physiology, Biotechnology  
Biotechnology in Clinical Medicine, Cell Physiology, Regenerative Medicine  
Fall 2017-Present

**Awarded:** The 2021 Elizabeth LeDuc Award for Excellence in Teaching in the Life Sciences

### *Courses Taught*

#### *Fall*

- BIOL 0170 Biotechnology in Medicine (Fall 2017, Enrollment: 86; Fall 2018, Enrollment: 155; Fall 2019, Enrollment: 161; Fall 2020, Enrollment: 117; Fall 2021, Enrollment: 187; Fall 2022, Expected Enrollment: >200)
- UNIV 1221: Brown Experiential Learning Practicum (Fall 2022, Expected Enrollment: 4)

#### *Spring*

- GISP 0008 Vaccine Hesitancy and Covid-19 (Spring 2022, Enrollment: 10)
- GISP 0005 Brown Boosts Immunity: Combating Vaccine Hesitancy in RI (Spring 2021, Enrollment: 15)
- BIOL 0940G Antibiotic Drug Discovery: Identifying Novel Soil Microbes to Combat Antibiotic Resistance (Spring 2020, Enrollment 16, Spring 2021, Enrollment 18)
- BIOL 0150D Techniques in Regenerative Medicine (Spring 2018, Enrollment: 12 (over-enrolled); Spring 2019, Enrollment: 13(over-enrolled) Spring 2020, Enrollment: 12, Spring 2021, Enrollment: 10 )
- BIOL 2180 Experiential Learning in Industry (On record as of March 2019)
- BIOL 1100 Cell Physiology and Biophysics (Spring 2018 Co-instructor with Anita Zimmerman while Diana Horrigan was on sabbatical, Enrollment: 32)
- BIOL 1070 Biotechnology and Global Health ( Spring 2019 Part of Brown/Pfizer MA in Biology, Groton, CT Campus, Enrollment: 11)

#### *Summer*

- UNIV 1221: Brown Experiential Learning Practicum (Summer 2022, Enrollment: 2)
- Summer@Brown Antibiotic Drug Discovery: Identifying Novel Soil Microbes to Combat Antibiotic Resistance (Summer 2019, Enrollment: 10 (full), Summer 2022, Enrollment: 6)
- Summer@Brown Antibiotic Drug Discovery: Identifying Novel Soil Microbes to Combat Antibiotic Resistance – Online (Summer 2020, 2 Sections Enrollment 20, 18, Summer 2021, Enrollment:18)

#### *Guest lectures*

- Biol 2167 In Vitro Models for Disease (Spring 2021, 2020, 2019)

**Adjunct Professor**, Rhode Island College, Providence, RI  
Department of Biology  
Fall 2017-Present

### *Courses Taught:*

- Biol 100 Fundamental Concepts of Biology
- Biol 108 Basic Principles of Biology
- Biol 335 Human Physiology
- Biol 460 Biology Senior Seminar

**Assistant Professor**, Rhode Island College, Providence, RI  
Department of Biology  
Fall 2014-Spring 2017

***Courses Taught:***

- Biol 111 Introductory Biology I
- Biol 221 Genetics
- Biol 335 Human Physiology

**Adjunct Faculty**, Community College of Rhode Island, Lincoln, RI  
Department of Biology  
Fall 2013-Fal 2014

***Courses Taught:***

- Biol 1020 Human Physiology

**Instructor**, Upward Bound, Rhode Island College

***Courses Taught:***

- Advanced Biology (Summer 2014, Summer 2017)

**Teaching Assistant**, Brown University, Providence, RI  
Department of Molecular Pharmacology, Physiology, and Biotechnology

***Courses Taught:***

- Biol 2230 Biomedical Engineering and Biotechnology Seminar (Fall 2011-May 2014)
- The Foundations of Living Systems (Spring 2010)

## Advising

**Oversight of Biology Undergraduate Education Advising**, Brown University  
Fall 2021-Present

- Provide strategic oversight of the BUE advising program. Work with BUE staff to ensure that students wishing to declare have successful pre-planning meetings (appx 200 per year), and that faculty advisors are assigned in a timely manner. Work with BUE staff to ensure seniors in the program are cleared for graduation in a timely manner.

**Biology Pre-Planning Advisor**, Brown University  
Fall 2021-Present

- Meet with pre-declared students to discuss their academic career to that point, and what they would like to accomplish with their remaining time. Guide students through the declaration process, including considerations for a cohesive course plan to complete their concentration.

**First Year Advisor**, Brown University  
Fall 2018-Present

- Advise 4-6 first year students with Meiklejohn Peer Advisor

**Sophomore Advisor**, Brown University  
Spring 2019-Present

- Continuation of advising of first year advisees and additional students

**Concentration Advisor**, Brown University

Spring 2018-Present

- Advise up to 36 students that have declared Biology AB, ScB, HHB

**Mentoring of Undergraduate TAs**, Brown University

Fall 2017-Present

- Professional development for undergraduate TAs in BIOL 0170, BIOL 0150D, BIOL 0940G and Summer at Brown.

**Informal Advising**

- Regularly meet with students outside of class time to discuss course selection, career plans etc, as well as provide letters of recommendation for students to graduate school, medical school, and internships.
- Continuation of informal advising for first-year and sophomore advisees if not assigned to them

**Service to the University**

**Member of the College Curriculum Council**, Fall 2021-present

**Development of Experiential Learning Pilot Programs**, Spring 2022-present

**Panel Member for Sheridan Center Open Curriculum Week**, Fall 2021

**Member of the Experiential Learning Task Force**, Summer 2021-Spring 2022

**Member of the University Undergraduate Lab Task Force**, Fall 2020-Spring 2021

**Anchor Institute Facilitator**, August 2020

**TEAM: Team Enhanced Advising and Mentoring**, 2018-present

**HHMI Participant**, 2017-present

**HHMI Inclusive Excellence Grant –Proposal Group**, 2019-2020

**Service to the Department**

**Co-chair of Biology Curriculum Committee**, Fall 2021-present

**Co-chair of Biology Undergraduate Committee DIAP committee**, Spring 2022-present

**MPPB Seminar Committee**, Fall 2019- Spring 2021

**MPPB Diversity and Inclusion Action Plan (DIAP) Committee**, Fall 2019-Spring 2021

**BME and Biotechnology (BMEB) Industry Outreach Committee**, Fall 2019-Spring 2021

**STEM outreach**

**Brown Boosts Immunity Advisor**, Fall 2020-Present

- Social media initiative to combat vaccine hesitancy
- Coordinated and volunteered with students at Johnston mass vaccination clinics with the mayor of Johnston and the Chief of Police
- Created educational materials for distribution
- Created exhibit for the Providence Public Library

**Science Education in Public Schools**, Johnston Public Schools, Johnston, RI, Fall 2018- present

- Guide in class discussion and demonstration

**Science Fair Judge**, Johnston Senior High School, Johnston, RI, Fall 2015-present

**Thesis Committees**

Megan Forrest, Brown University, Earned MS in Biotechnology, Spring 2022

Yanying Wu, Brown University, Earned MS in Biotechnology, Spring 2022

Maria Zhou, Brown University, Undergraduate, Second Reader, Spring 2022

Ilexia Schecter, Brown University, Undergraduate, Second Reader, Spring 2022

Rekha Nagarajan, Brown University, Earned MS in Biotechnology, Spring 2021

Kunzhao Li, Brown University, Earned MS in Biotechnology, Spring 2021

Emre Toner, Brown University Undergraduate, Second Reader, Spring 2021

Anqi Zhou, Brown University, Earned MS in Biotechnology, Spring 2020

Adriano Taglietti, Brown University, Earned MS in Biotechnology, Spring 2019

- Conferences and Seminars
- Jaclyn Alois, Brown University, Earned MS in BME, Spring 2018  
Victor Cox, Brown University, Earned MS in Biotechnology, Spring 2018  
Andrew Howes, Brown University, Earned MS in Biotechnology, Spring 2018  
Dylan Spangle, Brown University, Earned MS in Biotechnology, Spring 2018  
**AACU STEM Reform in Higher Ed PKAL Spring meeting**, Virtual, Spring 2021, Spring 2022  
**Sixth Annual Undergraduate Research Conference on Science, Technology, and Society**, Virtual, Spring 2022  
**Creating an Inclusive Learning Environment: An ASBMB Catalyst Conversation**, virtual, Spring 2022  
**Anchor Institute Participant**, Brown University, June 2020  
**CUREnet Institue**, Alabama State University, Summer 2019  
**Inclusive Teaching Webinar**, Columbia University, Summer 2019  
**Tiny Earth Symposium**, Virtual, Winter 2021, Summer 2021, Spring 2022
- Memberships and Societies
- RIBio**, 2020, 2021, 2022  
**Tiny Earth Network**, Certified Instructor, 2019-present
- Grants and Proposals
- Swearer Center, Engaged Course Development Grant**, Vaccine Awareness, Awarded: \$3000  
**HHMI-Sheridan Center Cure Faculty Institute**, To develop a course-based research experience Awarded, \$32,000
- Research Experience
- Stilwell Lab**, *Rhode Island College, Providence, RI*, August 2014-July 2017
- Developed mutant constructs of mutant superoxide dismutase (SOD) using molecular biology and genetics techniques to analyze in *Drosophila melanogaster*
  - Characterized mutant flies with ALS phenotype due to SOD mutations
  - Conducted a genome wide trans-heterozygous enhancer screen against superoxide dismutase activity *in vivo*
  - Developed a method to characterize motor neuron degeneration and neuromuscular junction in adult flies.
- Morgan Lab**, *Brown University, Providence, RI*, August 2008-May 2014 Thesis: The differential effects of p-glycoprotein on 3D microtissues
- Developed a method to quantify transport through 3D micro-tissues using epi-fluorescent microscopy
  - Measured the effects of p-glycoprotein inhibitors and gap junction inhibitors in primary cells and cell lines
  - Determined that p-glycoprotein inhibitors may block transport of drugs into tumors via the unwanted side effects on gap junctional communication
  - Created an artificial ovary to be used in *in vitro* maturation of oocytes
- Ostermeier Lab**, *The Johns Hopkins University, Baltimore, MD*, January 2006-May 2008
- Isolated and purified protein molecular switches through biochemical techniques to be used for kinetic assays
- Amgen Inc.**, *Enbrel Manufacturing Facility, West Greenwich, RI*, May 2007-August 2007
- Assigned to spare parts project which was designed to ensure that every system used in the manufacturing of Enbrel was equipped with the correct spare parts such that the mission of Amgen, “every patient, every time”, was achieved
  - Exposed to controlled cGMP
  - Created templates from P&IDs of 125 systems to be used for walk downs of the equipment

- Analyzed chromatography elution trends in Pi database
- Hands on exposure to the manufacturing facility of both upstream and downstream processes of the production of Enbrel

**Wharton Lab, Brown University, Providence, RI** May 2005-January 2007 (seasonal)

- Analysis of TGF- $\beta$  signaling pathway to determine the effect of *dpp* and *gbb* ligand location on cell communication in the imaginal discs and ovaries of *Drosophila melanogaster* using dissection, confocal microscopy, and SEM
- Designed vectors with specific restriction enzymes so that the *dpp* and *gbb* chimeras could be inserted to properly facilitate the expression in *Drosophila*
- Created protein chimeras of the *dpp* and *gbb* ligands by means of biochemical techniques

**Matunis Lab, The Johns Hopkins University School of Medicine, Baltimore, MD**

November 2004-February 2006

- Analysis of the JAK/STAT signaling pathway via the effect of ligand concentration on stem cell fate and renewal, *Drosophila melanogaster* used as model system
- Genetically engineered knock-out mutants and analyzed testes for a corresponding change in stem cell number via dissection and confocal microscopy

**Publications and Abstracts**

**Peer Reviewed Manuscripts**

1. Ephraim, E.\*\*, Sapkota, R.\*\*, Dawkins, X.\*\*, Faherty, P.\*\*, Pares-DaSilva, J.\*\*, **Achilli, TM**. Brown Boosts Immunity: A Community-Centric Approach to Project-Based Service-Learning in Higher Education. Journal of Higher Education Outreach and Engagement, Submitted, Minor revisions requested
2. Aguedlo, A\*\*, St. Amand, V, Lafond, D, Sahin, A, **Achilli, T**, Reenan, R, and Stilwell, G. Age-dependent degeneration of an identified adult leg motor neuron in a *Drosophila SOD1* Model of ALS. Biol Open 2020
3. Şahin A, Held A, Bredvik K\*\*, Major P, **Achilli TM**, Kerson A, Lipscombe D, Wharton K, Stillwell G and Reenan R. Human SOD1 ALS Mutations in a *Drosophila* Knock-in Model Cause Severe Phenotypes and Reveal Dosage-Sensitive Gain and Loss of Function Components. Genetics 2016.
4. Curran S., **Achilli TM**, Leary E., Wilks B\*\*, Vantangoli, M.M., Boekelheide K., and Morgan J A 3D Spheroid System to Evaluate Inhibitors of the ABCG2 Transporter in Drug Uptake and Penetration. *TECHNOLOGY* 3: 54-63, 2015
5. **Achilli TM**, McCalla S, Meyer J\*\*, Tripathi A, Morgan JR. Multi-Layer Spheroids to Quantify Drug Uptake and Diffusion in 3D. Molecular Pharmaceutics 2014.
6. **Achilli TM**, McCalla S, Tripathi A, Morgan JR. Quantification of the kinetics and extent of self-sorting in three dimensional spheroids. Tissue Eng Part C Methods 2012;18(4): 302-9.
7. **Achilli TM**, Meyer J\*\*, Morgan JR. Advances in the formation, use and understanding of multi-cellular spheroids. Expert Opin Biol Ther 2012;12(10): 1347-60.
8. Tejavibulya N\*\*, Youssef J, Bao B, **Ferruccio TM**, Morgan JR. Directed self-assembly of large scaffold-free multi-cellular honeycomb structures. Biofabrication 2011;3(3): 034110.
9. Krotz SP, Robins JC, **Ferruccio TM**, et al. In vitro maturation of oocytes via the pre-fabricated self-assembled artificial human ovary. J Assist Reprod Genet 2010;27(12): 743-50.
10. Youssef J, Bao B, **Ferruccio T-M**, Morgan JR. (2010), "Micromolded Nonadhesive Hydrogels for the Self-Assembly of Scaffold-Free 3D Cellular Microtissues" Methods in Bioengineering 3D Tissue Engineering. Francois Berthiaume and Jeffrey Morgan. Norwood, MA: Artech House. P 151-166

## Abstracts and Presentations

1. Masto, E.\*\*, Montaquila, N.\*\*, Naidu, M.\*\*, Roa, J.\*\*, Sorge, E.\*\*, **Achilli, TM**. The impact of Decaying Organic Matter on the Evolution of Novel Antibiotics in Soil. Tiny Earth Spring Meeting, May 2022
2. Golub, S.\*\*, Miller, B.\*\*, Rodrigues, A.\*\*, Rogalinki, N.\*\*, Zhao, Amy.\*\*, **Achilli, TM**. Biodiversity and Antibiotic Production Potential of Bacterial Colonies Near Water Sources on the Pacific and Atlantic Oceans. Tiny Earth Spring Meeting, May 2022
3. Aldana, M.\*\*, Aragon Vasquez, A.\*\*, Chen, J.\*\*, Moazzam, S.\*\*, Voulgaris, A.\*\*, Sapkota, R.\*\*, **Achilli, TM**. Evaluating the relationship Between Organic Carbon Content and Biodiversity and Antibiotic Production in Soil. Tiny Earth Spring Meeting, May 2022
4. Perales, M.\*\*, Devoe, T.\*\*, Castillo Espinal, J.\*\*, Koh, I., Subramanian, M.\*\*, Najman-Licht, Y.\*\*, Schor, G.\*\*, **Achilli, TM**. The Effect of SoilpH on Biodiversity and Prevalence of Novel, Antibiotic Producing Bacteria. Tiny Earth Spring Meeting, May 2022
5. Sapkota, R.\*\*, Dawkins, X.\*\*, Faherty, P.\*\*, **Achilli, TM**. Brown Boosts Immunity: A Community-Centric Approach to Project-Based Service-Learning in Higher Education. Sixth Annual Undergraduate Research Conference on Science, Technology, and Society. March, 2022
6. Achilli, TM, Monteiro, K., Smith, K. Goal: Incorporating Inclusive Practices into ~90 Biology Courses at Brown University. ASBMB Chalk Talk, February, 2022
7. **Achilli, TM.**, Valles, J., Harris, D., Colwill, R. How COVID-19 made me a more effective teacher: Leveraging resources for student centered learning in online/hybrid environments. Lead Workshop PKAL Winter Meeting. Virtual. January 2021.
8. Sapkota, R.\*\*, Dawkins, X.\*\*, Faherty, P.\*\*, **Achilli, TM**. A Response to Vaccine Hesitancy Amidst the COVID-19 Pandemic: A Student-Led Service-Learning Course Oral Presentation PKAL Summer Meeting. Virtual. June 2021.
9. Agudelo, A.\*\*, **Achilli, TM.**, Sahin, A., Reenan, R., Stilwell, G. Characterizing Motor Nerve Degeneration in a *Drosophila* Model of ALS. RI INBRE SURF conference. University of Rhode Island. July 2016
10. **Achilli, TM.**, Agudelo, A.\*\*, Sahin, A., Reenan, R., Stilwell, G. Characterizing Motor Nerve Degeneration in a *Drosophila* Model of ALS. National INBRE conference. Washington, DC. June 2016
11. St. Amand, V.\*\*, **Achilli, TM.**, Stilwell, G. Poster presentation. “Genome-wide Screen for Enhancers of Toxicity in a *Drosophila* model of ALS.” Northeast INBRE Conference. Bar Harbor, ME. September 2015
12. St. Amand, V.\*\*, **Achilli, TM.**, Stilwell, G. Poster presentation. “Genome-wide Screen for Enhancers of Toxicity in a *Drosophila* model of ALS.” RI INBRE SURF conference. University of Rhode Island. July 2015.
13. Nayyab, S.\*\*, **Achilli, TM.**, Stilwell, G. Poster presentation. “Characterization of the phenotype SOD1<sup>S111C</sup> mutation in *Drosophila* model of ALS” RI INBRE SURF conference. University of Rhode Island. July 2015.
14. LaFond, D.\*\*, **Achilli, TM.**, Stilwell, G. Poster presentation. “Characterization of Neuronal Oxidative Stress in ALS using a *drosophila* Model.” Quinnipiac University. Feb 2015.
15. **Achilli, T.M.**, McCalla, S., Tripathi, A., Morgan, J.R. “A New Model for Quantifying Drug Uptake and Transport in 3D Multicellular Spheroids: A Case Study for P-glycoprotein,” Oral Presentation. International Conference on Frontiers in Pharmaceutical Sciences, South Kingston, RI (URI), September 28-30, 2012
16. **Ferruccio, T.M.**, McCalla, S., Tripathi, A., Morgan, J.R. “Quantifying the Extent and Kinetics of Self-Assembly and Self-Sorting in 3D Microtissues,” Oral Presentation. Biomedical Engineering Society Fall Meeting, Austin Texas, October 6-9, 2010

\*\* denotes undergraduate

**Issued Patents**

1.U.S. Application No.: 13/623,599

Filing Date: September 20, 2012

Title: Differential Effects Of Drugs On Transport In A Multi-layer 3D Spheroid Model

Your Reference No.: BU 2079

Our Docket No.: 2670.2021-001

2. U.S. Application No.: 13/623,668

Filing Date: September 20, 2012

Title: Mechanotransduction By The Synergistic Action Of Heterotypic Cell Interactions

Brown Reference No.: BU 2095

Our Docket No.: 2670.2020-001