

James Endres Howell, Ph.D.

Department of Biochemistry and Molecular Biology
Eberly College of Science
The Pennsylvania State University
University Park PA 16802 USA

(814) 865-7736
howell@psu.edu
sites.psu.edu/howell
orcid.org/0000-0002-8855-7430

EDUCATION

- Ph.D. **University of California, Berkeley**
2005 Molecular and Cell Biology
Wnts are guidance cues in anterior-posterior neuronal migration.
- B.S. **University of Pittsburgh**
1998 Molecular Biology
concentrations in both Biochemistry and Cell Biology; honors thesis:
BiP plays multiple roles at the first checkpoint of the secretory pathway.

APPOINTMENTS

- July 2026 **Teaching Professor**
–present Penn State University Department of Biochemistry and Molecular Biology
- July 2020 **Associate Teaching Professor**
–June 2026 Penn State University Department of Biochemistry and Molecular Biology
- April 2013 **Assistant Teaching Professor**
–June 2020 Penn State University Department of Biochemistry and Molecular Biology
- July 2006 **Instructor and Coordinator of Undergraduate Advising**
–March 2013 Penn State University Department of Veterinary and Biomedical Sciences
- August 2005 **Assistant Professor** *non-tenure track one-year appointment*
–June 2006 Lock Haven University of Pennsylvania Department of Biological Sciences

TEACHING

NEW COURSE denotes courses (or special sections) developed *de novo*.
REDESIGNED denotes previously-listed courses fundamentally redesigned.

- BMB 401 **General Biochemistry I (3.0)**
REDESIGNED Core major course for our degrees; widely required service course. Structural biochemistry, enzyme kinetics and regulation. *Spring 2015, Summer 2015, Summer 2016, Fall 2016, Summer 2017, Summer 2018, Fall 2018, Summer 2019, Spring 2020, Summer 2020, Spring 2021, Summer 2021, Summer 2022, Summer 2023, Summer 2024, Summer 2025, Summer 2026*

BMB 464 REDESIGNED	Molecular Medicine (3.0) Senior-level selection: students learn, many of them for the first time, to approach primary literature and present it critically. We examine seven articles from the primary literature in detail, analyzing a recent finding on molecular mechanism and/or therapeutic candidates for Ebola, cystic fibrosis (including CRISPR/Cas9 genome editing), retinitis pigmentosa, facioscapulohumeral muscular dystrophy, beta thalassemia, and anthrax. <i>Fall 2014, Fall 2015, Spring 2017, Fall 2017, Fall 2018, Fall 2019, Fall 2020, Fall 2021, Fall 2022, Fall 2023, Fall 2024, Fall 2025</i>
ENGL 142N SC 142N NEW COURSE	Science in Literature (3.0) <i>formerly ENGL 297 and SC 297</i> Interdisciplinary general education course that fulfills Penn State requirements in Natural Science and Humanities. Developed with Dr. Scott Smith (English, Comparative Literature). Students build skills to understand and appreciate science (nuclear weapons, evolution, biotechnology, climate change) through the lens of literary portrayals and their impact on popular culture. <i>Co-instructor with Dr. Smith: Spring 2017, Spring 2018, Spring 2019, Spring 2021, Spring 2022; sole instructor: Spring 2023, Spring 2025, Spring 2026</i>
BISC 2 REDESIGNED	Genetics, Ecology, and Evolution (3.0) Large general education course for non-science-majors. Deep time, the Central Dogma of molecular biology and the Tree of Life, examples of and evidence for evolution, primate and hominid evolution. <i>Fall 2019, Fall 2020, Fall 2021, Spring 2022, Spring 2023, Spring 2024, Fall 2024, Spring 2025, Fall 2025, Spring 2026</i>
BMB 221 REDESIGNED	Applied Biochemistry (2.0) The focus is on clinical and biotechnology applications, as it is required for the Biotechnology BS and for degrees outside of the College of Science. Students choose syllabus topics by vote during Week 1, e.g. toxicology and pharmacology, drug design, metabolic engineering, applied structural biology and enzymology. <i>Spring 2020, Spring 2021, Spring 2022, Spring 2023, Spring 2024, Spring 2025, Spring 2026</i>
BMB 251 REDESIGNED	Molecular and Cell Biology I (3.0) Core major course for our degrees; widely required service course. DNA structure, replication, and repair; transcription; translation, protein synthesis, structure, and folding; gene regulation; membrane structure and transport, endomembrane system, secretory pathway, exocytosis and endocytosis; respiration and photosynthesis. <i>Spring 2014, Spring 2015, Spring 2016, Spring 2018, Fall 2023, Fall 2024, Fall 2025</i>
MICRB 201 REDESIGNED	Introductory Microbiology (3.0) Core major course for our degrees; widely required service course. Evolution and the Tree of Life, prokaryotic and eukaryotic cell structure; microbial nutrition, metabolism, and growth; microbial genetics, genomics, and gene regulation; prokaryotic and eukaryotic viruses; and basic immunology including tumor viruses and cancer. <i>Fall 2017 Honors section, Spring 2018, Fall 2018, Spring 2019, Fall 2019, Spring 2020 (co-instructor with Dr. Timothy Miyashiro), Fall 2020, Fall 2021, Fall 2022, Fall 2023</i>
SC 297G NEW COURSE	Science in Media (3.0) Interdisciplinary general education course that will be proposed to fulfill Penn State requirements in Natural Science and Social and Behavioral Sciences. Students build skills for understanding and appreciating science topics through the lens of mass media. Discussion of the COVID-19 virus, the novel vaccine, and the political and media response to these topics. <i>pilot: Spring 2024</i>

PSU 16 REDESIGNED	First Year Seminar: Science (1.0) An extended academic advising orientation for entering first year students. Critical thinking; study skills; time management; resources for research, careers, student health, study abroad, etc. <i>Fall 2013, Fall 2014, Fall 2015 (2 sections), Fall 2016, Fall 2017 (2 sections), Fall 2021, Fall 2022, Fall 2023, Fall 2024</i>
MICRB 411 NEW COURSE	Survey of Microbiology Literature (1.0) One-on-one mentoring in reviewing primary literature. Spring 2020 topics included infectious disease dynamics and nutrient cycles and their response to global ecological crises including global warming. Students deliver written and oral reviews of the literature after scaffolded instruction and independent reading. Testbed for developing a senior-level skills course in speaking, writing, and approaching primary literature. <i>Spring 2020</i>
MICRB 106	Elementary Microbiology (3.0) Clinical and agricultural applications in microbiology, service course for degrees outside of the College of Science. Topics include prokaryotic and eukaryotic cell structure; microbial nutrition, metabolism, and growth; microbial genetics; prokaryotic and eukaryotic viruses; and basic immunology, and basic microbial ecology and evolution. <i>Spring 2019</i>
BMB 211	Elementary Biochemistry (3.0) Survey course in biochemistry for a wide variety of degree programs in many colleges across the University. Structural biochemistry, enzyme kinetics, metabolic pathways, respiration and photosynthesis. <i>Spring 2016</i>
BMB 398B NEW COURSE	Problem solving (1.0) An optional problem-solving workshop for large lecture courses, led by peer Learning Assistants (LAs). Coordinating the course requires supervising LAs in leading the workshops, and mentoring LAs in applying and refining best practices in pedagogy. <i>Spring 2015 (BMB 251), Spring 2016 (BMB 251), Fall 2016 (BMB 401), Spring 2018 (BMB 251), Spring 2018 (MICRB 201)</i>
BMB 398A NEW COURSE	Majors Colloquium (2.0) “Molecular Mechanisms and Human Consequences.” All first year students entering the College of Agricultural Sciences with an interest in majors in Biochemistry and Molecular Biology, Microbiology, or Biotechnology are placed into this content-heavy “inverted classroom” first year seminar course. After introductory lectures in majors topics, each student worked closely with me in teams of four to choose a topic, prepare and record a video lecture, and lead an in-class discussion on a topic relevant to their chosen major. <i>Fall 2013, Fall 2014, Fall 2015, Fall 2016</i>
VBSC 50S NEW COURSE	Mechanisms of Disease (3.0) All first year students entering majors in Toxicology and Immunology and Infectious Disease were placed into this First Year Seminar. Introductory lectures in basic concepts and vocabulary in molecular and cell biology, pharmacology, toxicology, immunology, and epidemiology. Each student picked two course topics, and worked closely with me to research, prepare and deliver the lectures and facilitate classroom discussion. <i>Fall 2007, Fall 2008, Fall 2009, Fall 2010, Fall 2011, Fall 2012</i>
VBSC 497C NEW COURSE	Undergraduate Research Colloquium (1.0) Introductory lectures presented structure and conventions of peer-reviewed journal articles, scientific writing style, and the use of Pubmed and other online resources, in order to prepare students to begin to approach primary literature and respond in writing with substantive questions. Students prepared for class by drafting a summary of their own reading of the presenter’s recent papers. <i>Spring 2007, Spring 2008, Spring 2009, Spring 2010, Spring 2011, Spring 2012, Spring 2013</i>

RESEARCH SUPPORT

- Sept. 2009 NIH 5 RC1 ES018496-02 **Total costs: \$995,833**
–July 2012 **Co-Principal Investigator** with Dr. Tracy S. Hoover, Professor and Head, Department of Agricultural and Extension Education
- National Institutes of Health American Reinvestment and Recovery Act Grant *Recruiting the Next Generation of Environmental Toxicologists*.
- Aims: to develop and deliver online curriculum modules in environmental toxicology and professional development opportunities for teachers and student teachers; to provide research experience to talented high school students and recruit them into research careers in toxicology.
- Fall 2016– Penn State General Education Seed Grant **\$10,000**
Spring 2017 Dr. Scott Smith (English, Comparative Literature) and I won a seed grant from the Office of General Education to develop our new general education course “Science in Literature.”

PRESENTATIONS

- 2025 **Teaching Innovation Showcase.** “Engaging online course lectures using a green screen.D”
December 17 Live demonstration of my remote and in-person hybrid video teaching methods to colleagues across the Eberly College of Science.
- 2024 **Teaching astrobiology using science fiction: Octavia Butler’s *Dawn*.** Talk at
August 22 ASP2024 (Astronomical Society of the Pacific Conference), the premier teaching conference in astronomy and astrophysics. **By invitation.**
- 2024 **Remote teaching returns to the classroom.** Biochemistry and Molecular Biology
April 16 lunch seminar series. Shared my remote and in-person hybrid video teaching methods.
- 2023 **Authoring and presenting university courses with Emacs and a full libre software stack.** Demonstrated my online teaching methods and presented my own course
December 3 authoring software package **org-teach** at the **international** free software conference EmacsConf emacsconf.org.
- 2022 **A framework for prioritizing the search for exobiospheres.** Penn State Extraterrestrial Intelligence Symposium (PSETI). Poster presentation at international symposium.
June 27–29
- 2022 **A proposal for five landmarks for the emergence of exocivilizations.** Technosignature Seminar Series at NASA Goddard Space Flight Center. **By invitation.**
April 27
- 2022 **Science in 3D,** *Eberly College of Science*. “Step into molecular models with a green screen.” Office of Digital Learning pedagogy workshop. Shared methods and experiences enhancing instruction both in classrooms and over Zoom by modeling macromolecules with 3D animations.
March 9
- 2021 **A proposal for five landmarks for the emergence of exocivilizations.** Two-part
September 3 talk to the Penn State Extraterrestrial Intelligence Center (PSETI), exploring from first
October 29 principles topics in origin of life, evolution of complexity, and evolution of intelligence. **By invitation.**
- 2021 **Teaching Writing in Interdomain General Education Courses,** *Office for General Education* Panel member. Shared experiences teaching writing with peers at University
March 9 Park and Hazleton in focus-group study.

- 2017
August 11 **Science in Literature v1.0: a pilot inter-domain gen ed course.** Dr. Scott Smith and I presented the results of our General Education Seed Grant to instructors and administrators from University Park and many Commonwealth Campuses.
- 2016
August 15 **Building cross-campus teams to help 2+2 students succeed in Science majors.** Delivered hour-long training to CRRS (Commonwealth Campus academic advisers) during their annual summit at University Park.
- 2016
Feb. 11–12 **Starting out with LionPATH.** Invited by the LionPATH development and transition team to lead two-day training for all College of Science academic advisers in advance of adopting the new system.
- 2010
October 17 **Preparing for a Career in Academic Advising by Earning a Ph.D. in Molecular Biology.** Keynote address to Penn State Division of Undergraduate Studies annual regional Academic Advising Conference.
- 2008–2014 **Spend a Summer Day, Penn State Office of Admissions.** Presented, to audiences of over one thousand visitors, a one-hour comprehensive introduction to all 50+ bioscience oriented degree programs at Penn State during the largest admissions event of the year. Six events over two weeks in July and August for seven consecutive years.

SERVICE

- 2025–present **Awards and Scholarships Committee, Biochemistry and Molecular Biology. Chair** 2025–2026. Inaugural Chair of the faculty committee that recognizes the most deserving undergraduates with awards, including scholarships established by departmental alumni and retired faculty. This year we are working to improve outcomes and transparency by establishing best practices and codifying them into committee bylaws.
- 2024–present **Peer Teaching Evaluation Committee (PTEC), Biochemistry and Molecular Biology.**
2021–2022 This committee peer-evaluates undergraduate instruction. Each member is assigned two
2017–2018 courses per semester to evaluate, including classroom visits, summarized in writing.
- 2022–present **Summer Undergraduate Research Fellowship (SURF) selection subcommittee. Chair** (2022). Oversees review of fellowship proposals and distribution of awards.
- 2017–present **Outstanding Graduate Awards Luncheon, Chair, Biochemistry and Molecular Biology.** Organize and emcee the annual luncheon for our most distinguished graduates and their families on the Friday before Spring graduation.
- 2025–2026 **Departmental Accessibility Contact, Eberly College of Science.** Inaugurating and leading departmental efforts, and coordinating with College efforts, to bring all course materials into compliance with Americans with Disabilities Act requirements. This represents a major long-term effort that will require sustained leadership in the department and College.
- 2024–2025 **EmacsConf 2025, EmacsConf 2024.** Presentation proposal review committee member for international Free Software conference.
- 2024–2025 **World Campus Affairs and Hybrid/Online Teaching Committee, Department of**
2022–2023 Biochemistry and Molecular Biology. Oversees strategy, evaluation, and implementation of online teaching. **Co-chair, 2022–2023.**
- 2023 **Faculty Retreat Planning Committee.** Volunteered for *ad-hoc* committee formed in order to organize a departmental retreat for 2023.
- 2023–2024 **Microbiology Curriculum and Assessment Committee.** This committee oversaw the recent review and significant update to the bachelor's degree in Microbiology.

- 2022–2023 **Faculty Consulting Group** to the Remote Synchronous Implementation Task Force. Member of consulting committee to University-level task force on new remote synchronous courses.
- 2021–2022 **Teaching/Research Professor Faculty Affairs (TRFA) Committee**, *Biochemistry and Molecular Biology*. This committee reviews promotion dossiers for non-tenure track faculty in the department.
- 2017–2023 **Curricular Affairs and Assessment Committee (CAAC)**, *Biochemistry and Molecular Biology*. This committee oversees ongoing efforts to refine, formalize, and assess departmental undergraduate programs and courses.
- 2013–2023 **Undergraduate Program Steering Committee (UPSC)**, *Biochemistry and Molecular Biology*. This committee oversees administrative and academic aspects of departmental undergraduate programs. *Acting chair* (2013, during Dr. Wendy Hanna-Rose's sabbatical).
- 2017–2022 **CAAC subcommittee on General Education**, *Biochemistry and Molecular Biology*. Successfully obtained Faculty Senate approval for recertification of MICRB 106 to fulfill Natural Sciences graduation requirement (GN).
- 2013–2022 **New Student Orientation**, *Biochemistry and Molecular Biology*. **Chair** 2013-2017; member 2018–2022. This committee assignment recognizes instructional faculty who participate in summer academic advising for New Student Orientation. As chair, organized and led daily advising event for the entire summer.
- 2015–2017 **Undergraduate Professional Development Committee**, *Biochemistry and Molecular Biology*. This committee's efforts were directed to identifying and filling needs for undergraduates' professional development during and after their time in our programs.
- 2013–2017 Department liaison to the **Future Students Office**, *Eberly College of Science* Met with prospective students and their families during campus visits to talk about degree programs and careers in Biochemistry and Molecular Biology, Microbiology, and Biotechnology.
- 2013–2016 **Science Advising and Student Services (SASS)**, *Eberly College of Science* This committee oversees academic advising in the College.
- 2015–2016 **SASS subcommittee on Change of Location Outreach**. Helped to spearhead efforts to help 2+2 students in their successful transition to and graduation from University Park.
- 2010–2016 **Barry Goldwater Fellowship selection committee**, *University Fellowships Office*. Read applications and helped to choose candidates for the most prestigious undergraduate science fellowship in the United States.
- 2007–2016 **Pre-Professional Evaluation Committee**, *Penn State Pre-Medical Advising Office*. Participated in interviews of pre-medical applicants and helped prepare "committee letters."
- 2013–2015 **Undergraduate Program Assessment Committee Chair**. Responsible for coordinating departmental efforts to establish course- and program-level assessment instruments and infrastructure. Produced annual summary reports to the Provost's office.
- 2015 **Academic Adviser Search Committee**, *Biochemistry and Molecular Biology*. Succeeded in recruiting Jennifer Stingelin Keefer, MS, as a full-time undergraduate academic adviser.
- 2015 **Winston Churchill Fellowship Selection Committee**, *University Fellowships Office*.
- 2014 **Microbiology Lecturer Search Committee Co-Chair**, (with Dr. Meredith Defelice) *Biochemistry and Molecular Biology*. Succeeded in recruiting Dr. Gregory Broussard.

- 2014 **American Society for Biochemistry and Molecular Biology (ASBMB) accreditation**, *author*. Organized the effort and wrote the application for accreditation of our undergraduate program in Biochemistry and Molecular Biology from the national governing body in its first year. The program won accreditation. Dr. Meredith Defelice also made indispensable contributions.
- 2013–2014 **Schreyer Honors Advising Committee Co-Chair**. (with Dr. Sarah Ades).
- 2007–2013 **eLion Advising Team**, *Penn State Office for Undergraduate Education*. Sole faculty member on University-wide committee overseeing the maintenance and improvement of the academic advising functionality of the eLion system.

OUTREACH

- 2024–2026 **The Print Factory**. Volunteer weekly at anti-racist LGBTQ+ supporting used bookstore and community resource center in Bellefonte, PA. Organizing and hosting open-mic music and poetry readings, participating in queer youth events (and many other events), as well as retail duties, pricing and shelving books, and the like. This all-volunteer community center is a centerpiece of my public activity as a visible ally and supporter of a safe and welcoming environment for all students at Penn State.
- August 9, 2025 **Skype a Scientist**. Volunteered with this national organization for science outreach. Presented my research and career advice to Global Science & Medicine Summer Session, a STEM summer camp for international high-school students.
- August 8, 2025 **Podcast interview** with Protesilaos Stavrou, “Prot Asks: James about biology teaching, Emacs, and free software politics,” in which we discussed my digital and in-person teaching methods and my teaching philosophy. <https://protesilaos.com/codelog/2025-08-06-prot-asks-james-biology-teaching-emacs-free-software-politics/>
- July 2, 2025 **Skype a Scientist**. Volunteered with this national organization for science outreach. Presented my research and career advice to Utah Tech PREP, a STEM summer camp for middle-school students in Utah.
- June 7, 2025 **Play Catch With a Dad**. Volunteered at the **State College Pride Festival** with a national organization. Volunteer Dads attend Pride Events offering to throw a football and give a hug to those adult members of the LGBTQ+ community that lost or never had the support of a father.
- May 6, 2025 **Podcast interview** with Joe Ressington (*Late Night Linux*) on ethics and best practices for teaching writing courses after students’ widespread adoption of AI and Large Language Models. (episode has not yet aired, <https://latenightlinux.com/>)
- 2016–2020 **Gray’s Woods Elementary School Annual STEAM Fair Co-Chair**. Organize and emcee annual Science Technology Engineering Art and Math Fair at local elementary school.
- 2013 and 2016 **Science U**, *Eberly College of Science summer day camp*. Played a suspect in two different week-long Crime Scene Investigation activities for grade 2–12 students at Penn State’s signature summer science day camp. Subjected to two grueling half-days of interrogation by budding CSI investigators.

HONORS AND AWARDS

- 2018 **Paul M. Althouse Outstanding Teaching Award**
Department of Biochemistry and Molecular Biology.

PROFESSIONAL DEVELOPMENT

- 2025–present **Accessibility in the Curriculum (AIC)** Provost Endorsement Program. *Penn State University*. Enrolled in Penn State Accessibility certificate program, expected completion Spring 2026.
- 2025
August 5 **Safer People Safer Places.** *Penn State University Student Affairs, Center for Sexual and Gender Diversity*. Day-long workshop to recruit faculty and staff into a “campus-wide program designed to raise visibility about the LGBTQ+ population, increase the understanding of issues facing LGBTQ+ students, faculty, and staff, and raise the awareness of the various LGBTQ+ resources available across Penn State.”
- 2023
August 18 **Student Research Symposium**, *Penn State University*. Half-day symposium in which departmental third-year PhD students presented their dissertation research.
- 2022
June 27–29 **Penn State Extraterrestrial Intelligence Symposium.** International conference. Presented original research on planetary parameters for origin of life and evolution of technosignature-producing intelligence.
- 2020
July 28 **Engaging Students with Zoom**, *Eberly College of Science*. Office of Digital Learning pedagogy workshop for enhancing student engagement in remote synchronous courses.
- 2020
April 18 **Structured Nucleic Acids Day**, *Penn State University*. Half-day symposium on non-canonical structured nucleic acids.
- 2018
May 7–11 **Evidence-Based Teaching Academy**, *Eberly College of Science*. Cross-disciplinary pedagogy workshop for faculty selected from all the departments in the College.
- 2018
March 10 **Biomolecular Vizualization Workshop**, *Morgan State University*. Methods workshop for incorporating molecular visualization into course materials and assignments.

SELECTED PUBLICATIONS

- Howell, J. E.** (2025) “Science in Literature: Teaching Astrobiology Using Octavia Butler’s *Dawn*” in *ASP2024: Astronomy Across the Spectrum*, ASP Conference Series, Vol. 539 (Schultz G., Buxner S., Jensen J., and Barnes J., eds.) [preprint link](#)
- Howell, J. E.** (2019) *Research Notes of the American Astronomical Society*. Comment on “A Limited Habitable Zone for Complex Life” (Schwieterman et al. 2019 ApJ 878, 19). <https://doi.org/10.3847/2515-5172/ab2a76>
- Howell, C. E. and **J. E. Howell**. (2010) *American Biology Teacher* 72:313–314. Sectioning clay models makes anatomy and development tangible. <http://doi.org/10.1525/abt.2010.72.5.12>
- Pan, C. L., **J. E. Howell**, S. G. Clark, M. Hilliard, S. Cordes, C. I. Bargmann, and G. Garriga. (2006) *Developmental Cell* 10:367–77. Multiple Wnts and frizzled receptors regulate anteriorly directed cell and growth cone migrations in *Caenorhabditis elegans*. <http://doi.org/10.1016/j.devcel.2006.02.010>
- McClellan, A. J., **J. B. Endres**, J. P. Vogel, D. Palazzi, M. D. Rose, and J. L. Brodsky. (1998) *Mol. Biol. Cell* 9:3533–3545. Specific Molecular Chaperone Interactions and an ATP-dependent Conformational Change Are Required during Posttranslational Protein Translocation into the Yeast ER. <http://doi.org/10.1091/mbc.9.12.3533>