

Peter Hu  
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January 14, 2024

Texas A&M University–Commerce  
2200 Campbell Street  
Commerce, TX 75428

Dear Prof. Williams and Search Committee,

It is with great enthusiasm and excitement that I apply for the position of Assistant Professor – Physics and Astronomy. I believe that my qualifications match well for the position. I am committed to supporting and implementing high-quality physics and science education, which culminated in the fall of 2023 in my teaching of an algebra-based introductory physics course as the instructor of record, with extremely positive student feedback (links to which can be found in my teaching statement). I have been involved in research on quantum mechanics education and a number of initiatives to empower and raise the self-efficacy of students from historically marginalized groups. I am excited to seek out possible opportunities for collaboration, including across disciplines, in pursuit of better and more integrated physics and science education.

Teaching is one of my greatest joys. I have taught physics at the undergraduate level for multiple semesters, serving as an instructor of record, recitation instructor, and laboratory instructor for large-enrollment classes. My passion for teaching extends as far back as my undergraduate career, having taught in some capacity at a number of different institutions. My proclivity for and dedication to excellent teaching have led me to my current career in Physics Education Research (PER). In my work, I investigate the effectiveness of research-based instructional tools in physics courses; within three years of my Ph.D. studies, I have had four journal articles published, with two more in preparation. My research has lent key paradigms that inform my day-to-day teaching as well as yielding useful instructional materials that, with updates and refinements, will serve me and other instructors well for a lifetime. I can synergize well with present PER faculty in implementing and evaluating best practices in teaching physics and astronomy, both novel and established, including in efforts of improving student attitudes and elevating belonging. I can also help bring students in closer direct alignment with the skills necessary for the research programs in which they participate. To more effectively teach the core concepts of physics. I am always interested in further developing teaching tools, methods, and frameworks.

In addition, I am particularly interested in connecting my native field of physics with other scientific disciplines. Having taught as an undergraduate teaching assistant for the Honors biology course at my institution, I am equipped with a broad view of relevant contexts and examples of near transfer that could better scaffold students' understanding of physics concepts and their roles in biological contexts. My work in quantum information science also has natural

overlap with the field of chemistry, and I have spoken at length about quantum mechanical and introductory chemistry concepts with a member of my dissertation committee, who is from the chemistry department, about content that could bridge the fields for undergraduates taking courses in both departments.

I am also constantly engaging with and reflecting upon the influence of student identity, systemic structures, and their various interactions on student learning. My teaching has been and always will be informed by evidence-based approaches in both instructional practice and the greater milieu of diversity, equity, and inclusion. To ensure equitable education environments and outcomes, it is extremely important to develop students' agency and eliminate barriers, including ones born of prejudices and societal perceptions as well as pervasive attitudes within the teaching and learning environment. I am mindful to bring these considerations and approaches to my own classroom and open to investigating ways of addressing these issues.

In summary, as a graduating PhD student passionate about teaching, my rich practical experience is supported by a robust fluency in research and a commitment to using evidence-based approaches in my teaching. I am dedicated to welcoming all students into an equitable and inclusive classroom environment, as well as any who wish to join my undertakings. I am very excited about the prospect of working with faculty at Texas A&M University–Commerce who constantly strive to improve STEM education for all students, regardless of background or identity, who are interested in or could stand to benefit from the way science touches all our lives.

Thank you very much for your consideration!

Sincerely,

A handwritten signature in black ink, appearing to read 'Peter Hu', with a stylized, cursive script.

Peter Hu

*\*In light of the limit of five attachments on the application, I have included the names and contact information of my three professional references on the next page.*

# CURRICULUM VITAE

## PETER T. HU

### CONTACT INFORMATION

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Institution     Department of Physics and Astronomy, University of Pittsburgh  
3941 O'Hara St, Pittsburgh, PA 15213  
Phone            (215) 206-1393  
Email            [pth9@pitt.edu](mailto:pth9@pitt.edu)

### EDUCATION

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2020 – 2024     | **University of Pittsburgh**, Pittsburgh, PA  
Ph.D. candidate, Physics Education Research, Department of Physics and Astronomy

2016 – 2020     | **University of Pittsburgh**, Pittsburgh, PA  
Summa Cum Laude, B.S. in Physics and Astronomy with Program Honors

### AWARDS AND ACADEMIC HONORS (SELECTED)

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2022 – 2023     | Graduate and Professional Student Government Travel Grant

2023              | Arts and Sciences Graduate Student Organization Travel Grant

Spring 2023     | Nominated for Myron P. Garfunkel Excellence in Graduate Student Teaching Award

2022              | Arts and Sciences PBC and Alumni Travel Fellowship

Fall 2020 –  
Spring 2021     | Two-term University of Pittsburgh Kenneth P. Dietrich School of Arts & Sciences  
Fellowship

April 2020       | Peter F. M. Koehler Jr./Sr. Academic Achievement Award

### TEACHING EXPERIENCE

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**Instructor of record**, University of Pittsburgh

Fall 2023         | **Introduction to Physics 1 (PHYS 0110)**

- Independently taught a 160-student section of a standard 3-credit undergraduate algebra-based physics course
- Managed 2 teaching assistants and 2 undergraduate teaching assistants
- Prioritized elevation of student self-efficacy, peer collaboration, and conceptual understanding over memorization
- Sought many avenues of student feedback through weekly and end-of-semester assignments
  - Assignment in which students evaluate and reflect upon their own learning received powerful, sincere, and grateful comments; submissions

- found [here](#) (first page of each PDF consists of my own comments; submission begins on second page)
- Overwhelmingly positive feedback in [teaching evaluations](#), including average scores as high as 4.66 on a 5-point Likert scale, indicates success in achieving the listed goals and values

## Teaching Assistant, University of Pittsburgh

Spring 2022

### Introduction to Laboratory Physics (PHYS 0212)

- Taught 2 sections of the course (~30 students each, 6 hours/week)
- Facilitated student laboratory activities, offered guidance to ensure student success; held office hours and graded student assignments

Fall 2021

### Basic Physics, Science and Engineering 1 (PHYS 0174)

- Taught 2 sections of the course (~30 students each, 2 hours/week)
- Held office hours and graded student assignments
- Delivered research-based intervention designed to foster an equitable and inclusive learning environment

Summer 2021  
(Sessions I-II)

### Introduction to Physics 1 (PHYS 0110)

- Taught 1 section of the course for each session (~20 students each, 2 hours/week)
- Held office hours and graded student assignments
- [Session II] Taught as substitute lecturer during planned absence of professor

## Other teaching experience

Spring 2021

### Student project mentor – Introduction to Quantum Mechanics

*University of Pittsburgh, Pittsburgh, PA*

- Provided mentoring services to students in an undergraduate quantum mechanics course regarding the development of educational tools

July 2019

### Laboratory teaching assistant – Experimental Physics Research Academy

*University of Pennsylvania, Philadelphia, PA*

*Supervisors: Mr. Bill Berner, Mr. Peter Harnish, Ms. Mary Marcopul*

- Provided guidance to and answered questions for high school students in an intensive lab-based curriculum
- Helped set up and disassemble lab equipment and demonstrations

Spring 2019

### Undergraduate teaching assistant – Honors Foundations of Biology

*University of Pittsburgh, Pittsburgh, PA*

*Supervisor: Zuzana Swigonova, Ph.D.*

- Addressed student questions and concerns for the duration of the course; held office hours and review sessions for students
- Directed, wrote, composed for, and animated a series of videos on challenging concepts in the curriculum: DNA replication, the Central Dogma, the Lac Operon, Attenuation, and Phylogeny (click [here](#) to view the playlist)

2018 – 2020

### Physics tutor

*Allerdice High School, Pittsburgh, PA*

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|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | <p><i>Mentor: Janet Waldeck, Ph.D.</i></p> <ul style="list-style-type: none"> <li>Assisted students with homework and questions in AP Physics C: Mechanics</li> <li>Provided private tutoring for three students by request</li> </ul>                                                                                                                                                                  |
| June 2018       | <p><b>Teaching assistant</b> – NASA/Challenger Learning Center Workshop Partnership<br/> <i>La Salle University, Philadelphia, PA</i></p> <ul style="list-style-type: none"> <li>Participated in curriculum training and assisted workshop instructor with preparatory work</li> <li>Supervised workshop activities and received high acclamation from students</li> </ul>                              |
| May – June 2018 | <p><b>Teaching assistant</b> – AP Literature and Composition<br/> <i>Upper Dublin High School, Fort Washington, PA</i><br/> <i>Mentor: Mr. Jake Scalici</i></p> <ul style="list-style-type: none"> <li>Contributed to lesson plans and class discussions about writing</li> <li>Offered suggestions and feedback for students' final papers; assisted in reading and grading of final papers</li> </ul> |

## RESEARCH EXPERIENCE

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| Fall 2020 – Present     | <p><b>Physics education research</b><br/> <i>University of Pittsburgh, Pittsburgh, PA</i><br/> <i>Advisor: Chandralekha Singh, Ph.D.</i></p> <ul style="list-style-type: none"> <li>Developing research-validated interactive learning materials for the teaching of undergraduate-level quantum mechanics, including for quantum information science (QIS): <ul style="list-style-type: none"> <li><u>Clicker Question Sequences (CQSs)</u>: Sequences of multiple-choice questions, built on student difficulties, to be presented during class time to drive opportunities for student engagement, peer instruction, and class discussions</li> <li><u>Quantum Interactive Learning Tutorials (QuILTs)</u>: Guided inquiry tutorials that explore and develop concepts and address student difficulties in detail</li> </ul> </li> </ul> |
| Summer 2023             | <p><b>Discipline-Based Science Education Research Center Teacher-Scholar</b><br/> <i>University of Pittsburgh, Pittsburgh, PA</i></p> <ul style="list-style-type: none"> <li>Attended and facilitated weekly presentations and discussions of evidence-based teaching methods implemented in science courses</li> <li>Participated in review and feedback-provisioning process for Course Transformation Award proposals</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         |
| Spring 2020             | <p><b>Undergraduate directed research</b><br/> <i>University of Pittsburgh, Pittsburgh, PA; funded by NASA Pennsylvania Space Grant Consortium</i><br/> <i>Advisors: Russell Clark, Ph.D. and David Turnshek, Ph.D.</i></p> <ul style="list-style-type: none"> <li>Programmed a model using Python which numerically solves equations of motion to predict weather balloon dynamics through typical atmospheric flight</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |
| Fall 2019 – Spring 2020 | <p><b>Undergraduate research project on teaching</b><br/> <i>University of Pittsburgh, Pittsburgh, PA; funded by Chancellor's Undergraduate Research Fellowship</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

*Advisors: Russell Clark, Ph.D. and David Turnshek, Ph.D.*

- Designed and conducted an investigation, entitled “Examining the effects of model-based animations on student learning and attitudes in an introductory biology course”
- Wrote learning modules aimed to develop facility with models to accompany lectures and videos on specific content
- Analyzed results and implemented feedback to drive further improvements to the series

January 2018

#### **Illustrator**

Liu, J. et al. (2018). An Integrated TCGA Pan-Cancer Clinical Data Resource to drive high quality survival outcome analytics. *Cell* 173, 400-416.

- Helped with the visual presentation of a landmark paper in the prestigious journal *Cell* by illustrating the graphical abstract describing the content

### **PEER-REVIEWED JOURNAL PUBLICATIONS**

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1. **Hu, P.**, Li, Y., & Singh, C. (in preparation). Investigating and improving student understanding of the basics of quantum computing.
2. **Hu, P.**, Li, Y., Mong, R. S. K., & Singh, C. (under review). Student Understanding of the Bloch Sphere.
3. **Hu, P.**, Li, Y., & Singh, C. (2023). Challenges in addressing student difficulties with basics and change of basis for two-state quantum systems using a multiple-choice question sequence in online and in-person classes. *European Journal of Physics*, 44(6), 065703. <https://doi.org/10.1088/1361-6404/acf5b3>
4. **Hu, P.**, Li, Y., & Singh, C. (2023). Challenges in addressing student difficulties with quantum measurement of two-state quantum systems using a multiple-choice question sequence in online and in-person classes. *Physical Review Physics Education Research*, 19(2), 020130. <https://doi.org/10.1103/PhysRevPhysEducRes.19.020130>
5. **Hu, P.**, Li, Y., & Singh, C. (2023). Challenges in addressing student difficulties with measurement uncertainty in two-state quantum systems using a multiple-choice question sequence in online and in-person classes. *European Journal of Physics*, 44(1), 015702. <https://dx.doi.org/10.1088/1361-6404/ac9ba3>
6. **Hu, P.**, Li, Y., & Singh, C. (2022). Challenges in addressing student difficulties with time-development of two-state quantum systems using a multiple-choice question sequence in virtual and in-person classes. *European Journal of Physics*, 43(2), 025704. <https://doi.org/10.1088/1361-6404/ac49f4>

### **PEER-REVIEWED CONFERENCE PROCEEDINGS PUBLICATIONS**

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1. **Hu, P.**, Li, Y., & Singh, C. (2023). Development, validation and online and in-person implementation of clicker question sequence on change of basis. *Proceedings of the 2023 Physics Education Research Conference*, 138-144. <https://doi.org/10.1119/perc.2023.pr.Hu>
2. **Hu, P.**, Li, Y., & Singh, C. (2022). Development, validation and virtual and in-person implementation of clicker question sequence on quantum measurement uncertainty. *Proceedings of the 2022 Physics Education Research Conference*, 230-236. <https://doi.org/10.1119/perc.2022.pr.Hu>

3. **Hu, P.**, Li, Y., & Singh, C. (2021). Using a clicker question sequence to teach time-development in quantum mechanics. *Proceedings of the 2021 Physics Education Research Conference*, 184–190. <https://doi.org/10.1119/perc.2021.pr.Hu>

## CONFERENCE PRESENTATIONS

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1. **Hu, P.**, Li, Y., & Singh, C. (2023, July 19-20). *Development, validation and online and in-person implementation of clicker question sequence on change of basis* [Poster session]. Physics Education Research Conference 2023, Sacramento, CA, United States.
2. **Hu, P.**, Li, Y. & Singh, C. (2023, July 15-19). *Clicker Questions as Instructional Tools to teach Measurement Uncertainty in Two-state Systems* [Poster session]. 2023 American Association of Physics Teachers Summer Meeting, Sacramento, CA, United States.
3. **Hu, P.**, Li, Y. & Singh, C. (2023, July 15-19). *Clicker Questions as Instructional Tools to teach Time-development of Two-state Systems* [Poster session]. 2023 American Association of Physics Teachers Summer Meeting, Sacramento, CA, United States.
4. **Hu, P.**, Li, Y. & Singh, C. (2023, July 15-19). *Clicker Question Sequence on Two-State System Basics and Change of Basis: Virtual and In-Person Implementation* [Conference presentation]. 2023 American Association of Physics Teachers Summer Meeting, Sacramento, CA, United States.
5. **Hu, P.**, Li, Y., and Singh, C. (2023, April 18-21). *Developing a Clicker Question Sequence (CQS) to Improve Students' Understanding in Quantum Mechanics* [Poster session]. NARST 96<sup>th</sup> Annual International Conference, Chicago, IL, United States.
6. **Hu, P.**, Li, Y., & Singh, C. (2022, July 13-14). *Development, validation and virtual and in-person implementation of clicker question sequence on quantum measurement uncertainty* [Poster session]. Physics Education Research Conference 2022, Grand Rapids, MI, United States.
7. **Hu, P.**, Li, Y. & Singh, C. (2022, July 9-13). *Using clicker question sequence to teach time-development in quantum mechanics* [Poster session]. 2022 American Association of Physics Teachers Summer Meeting, Grand Rapids, MI, United States.
8. **Hu, P.**, Li, Y. & Singh, C. (2022, July 9-13). *Clicker Question Sequence on Uncertainty Principle: Virtual and In-Person Implementation* [Conference presentation]. 2022 American Association of Physics Teachers Summer Meeting, Grand Rapids, MI, United States.
9. Liu, J., **Hu, P.**, Raj-Kumar, P., Praveen-Kumar, A., Lin, X., Shriver, C., and Hu, H. (2022, April 8-13). *Association of cancer treatment response, recurrence and underlying molecular reasons for over 22 TCGA tumor types* [Poster session]. American Association for Cancer Research Annual Meeting 2022, New Orleans, LA, United States.
10. **Hu, P.**, Liang, L. L., Chen, Y., and Terada, T. (2022, March 27-30). *Examining NGSS Scientific Practices in K-12 Science Classrooms* [Conference presentation]. NARST 95<sup>th</sup> Annual International Conference, Vancouver, British Columbia, Canada (presented virtually).
11. **Hu, P.**, Li, Y., & Singh, C. (2021, August 4-5). *Using a clicker question sequence to teach time-development in quantum mechanics* [Poster session]. Physics Education Research Conference 2021, Virtual Conference.
12. **Hu, P.**, Li, Y. & Singh, C. (2021, July 31-August 4). *Using clicker question sequence to teach time-development in quantum mechanics*. 2021 American Association of Physics Teachers Virtual Summer Meeting [Conference presentation], Virtual Conference.
13. **Hu, P.**, Liang, L. L., Chen, Y., and Terada, T. (2021, April 7-10). *Implementation of NGSS Scientific Practices in Elementary Science Classrooms: A Comparative Study of Video Analysis* [Conference presentation]. NARST 94<sup>th</sup> Annual International Conference, Virtual Conference.
14. **Hu, P.**, Liang, L. L., Chen, Y., and Terada, T. (2021, April 8-12). *Examining Elementary Science Teaching: A Video Analysis of Next Generation Science Standards (NGSS) Scientific Practices* [Conference presentation].

- presentation]. 2021 American Educational Research Association Virtual Annual Meeting, Virtual Conference.
15. Liang, L. L., & **Hu, P.** (2019, October 6-7). *Science/Math Integration for a Sustainable Planet* [Conference presentation]. 2022 Pennsylvania Science Teachers Association (PSTA) Conference, Lancaster, PA, United States.
  16. Ru, Y., **Hu, P.**, Kovatich, A. J., Hooke, J., Liu, J., Kvecher, L., Fantacone-Campbell, J., Deyarmin, D., Kovatich, A. W., Cammarata, F., Rui, H., Davidson-Moncada, J., Shriver, C., and Hu, H. (2015, December 8-12). *CD163 expression is associated with young age, triple negative subtype, and poor outcome in breast cancer* [Conference presentation]. The 2015 San Antonio Breast Cancer Symposium, San Antonio, TX, United States.
  17. Craig, J., Kovatich, A. J., Hooke, J., Kvecher, L., **Hu P.**, Liu, J., Fantacone-Campbell, J., Rui, H., Shriver, C., and Hu, H. (2015, December 8-12). *Phospho-histone H3 as a prognostic marker in breast cancer: High expression is associated with younger age, triple negative subtype, and disease specific survival* [Conference presentation]. The 2015 San Antonio Breast Cancer Symposium, San Antonio, TX, United States.

## Workshop Leadership

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|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2023 –<br>present | <b>Ecological Belonging Intervention Workshop</b><br><i>Department of Physics and Astronomy, University of Pittsburgh</i> <ul style="list-style-type: none"> <li>Conducting workshops to train graduate teaching assistants to implement an intervention in introductory physics courses destigmatizing struggle</li> <li>Intervention has been shown to reduce cognitive overload, improve classroom culture, reduce stereotype threat</li> </ul> |
| 2022 –<br>present | <b>Graduate Teaching Assistant Workshop Leader</b><br><i>Discipline-Based Science Education Research Center, University of Pittsburgh</i> <ul style="list-style-type: none"> <li>Conducting workshops to train new graduate teaching assistants from different STEM departments each academic year</li> </ul>                                                                                                                                      |
| 2021 –<br>present | <b>Undergraduate Teaching Assistant Workshop Leader</b><br><i>Discipline-Based Science Education Research Center, University of Pittsburgh</i> <ul style="list-style-type: none"> <li>Conducting workshops to train undergraduate teaching assistants from different STEM departments each semester</li> </ul>                                                                                                                                     |

## PROFESSIONAL SERVICE

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### Conference proceedings reviewer

- Physics Education Research Conference (PERC) Proceedings 2021, 2022, 2023

## COMMUNITY SERVICE

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|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| May 2023 | <b>Moderator for AAPI Heritage Month Career and Civic Engagement discussion panel at Upper Dublin Public Library</b><br><i>Upper Dublin, PA</i> <ul style="list-style-type: none"> <li>Organized by 6 organizations in the greater area</li> <li>Panelists included a school district superintendent, school district board member, and professor at Drexel University</li> </ul> |
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|---------------------|-------------------------------------------------------------------------------------------------------------------------------|
| April 2020          | <b>Coordinator of Upper Dublin Students and Families Fighting Against COVID-19 Task Force</b><br><i>Upper Dublin, PA</i>      |
| April 2020          | <b>Coordinator, translator, and donor representative of <i>People to People</i> mask donation drive</b><br><i>Windber, PA</i> |
| 2019                | <b>Webmaster of Upper Dublin Chinese-American Association</b><br><i>Upper Dublin, PA</i>                                      |
| July 2017 – present | <b>Organizer of <i>Real Talk</i> student-parent forum series (5 in total)</b><br><i>Upper Dublin, PA</i>                      |
| July 2018           | <b>Assistant for Advanced Placement Summer Institute</b><br><i>La Salle University, Philadelphia, PA</i>                      |

## SKILLS AND INTERESTS

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Proficiency in R and Python coding languages; fluency in Mandarin and proficiency in French; experience in piano, viola, guitar, music composition; self-taught experience in drawing and writing