

Department of Chemistry  
Center for Bioactive Delivery, Institute for Applied Life Science  
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## Education

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| <b>2020-present</b>    | Ph.D. Candidate (NIH-UMass Biotechnology Training Program Fellowship)<br>Department of Chemistry, University of Massachusetts-Amherst<br>(Advisor: Prof. Dr. Sankaran Thayumanavan) |
| <b>2014-2016</b>       | Master of Science<br>Department of Chemistry, National Tsing Hua University<br>(Advisor: Prof. Dr. Chi-How Peng)  |
| <b>2010-2014</b>       | Bachelor of Science<br>Department of Biomedical Engineering and Environmental Science, National Tsing Hua University  |
| <b>02/2024-10/2024</b> | Credential of Readiness (CRe) – Certificate Courses: Business Analytics, Economics for Managers, and Financial Accounting<br>Harvard Business School Online                         |
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## Research Interests

- Controlled polymerization techniques, including atom transfer radical polymerization (ATRP), reversible addition–fragmentation chain transfer (RAFT), and ring-opening metathesis polymerization (ROMP)
  - Polymeric systems for targeted delivery of therapeutic agents, including small molecules, genes, and proteins
  - Antibody–polymer conjugates for targeted protein degradation and anticancer molecule delivery
  - Functional polymers for processing advanced electronic materials
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## Experience

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| <b>09/2020-present</b> | <b>Graduate Research Assistant</b><br>Department of Chemistry, University of Massachusetts-Amherst<br>(Advisor: Prof. Dr. Sankaran Thayumanavan) <ul style="list-style-type: none"><li>• Invented a novel extracellular targeted protein degradation platform and engaged with licensing officers in the UMass Technology Transfer Office, resulting in the initiation of a patent review process</li><li>• Spearheaded the development of polymer materials crucial for driving forward multiple projects across diverse domains, including polymer-based antibody-drug conjugates, siRNA delivery, protein delivery, and targeted protein degradation</li><li>• Led teams in composing grant proposals for UMass Amherst internal funding, NSF and NIH funding (e.g., <i>National Institutes of Health R01 Award: Polymeric Lysosome Targeting Chimeras (PolyTACs): A biomaterials platform for cell-specific degradation of membrane proteins</i>, percentile:15, status: pending)</li></ul> |
| <b>10/2018-05/2020</b> | <b>Polymer Engineer</b><br>Core Polymer Technology, Electronics & Industrial, DuPont de Nemours, Inc., Hsinchu, Taiwan<br>(Advisor: Dr. Tsung-Han Tsai) <ul style="list-style-type: none"><li>• Invented a Led the development of polymer technology for advanced semiconductor/PCB packaging materials, with a focus on emerging technologies such as 5G connectivity</li><li>• Managed a substantial budget, overseeing a team of three research assistants in the establishment of cutting-</li></ul>  |

edge lab facilities and infrastructure. Directed efforts across multifunctional teams, encompassing infrastructure development, instrumentation, and experimental design

- Collaborated with the business development unit to devise and implement strategic planning initiatives, organizing the seamless integration of new technologies into product iterations across different generations
- Integrated in-house R&D and outsourced production capabilities across multifunctional teams, streamlining the product development process from lab-scale prototyping to scale manufacturing

**10/2016-08/2018**

**Research Assistant**

Department of Chemistry, National Tsing Hua University  
(Advisor: Prof. Dr. Chi-How Peng)

- Established and managed the Stimuli-Responsive Polymers and Functional Materials sub-group, overseeing lab infrastructure, mentoring 5 graduate students, and contributing to successful grant proposals
- Led industry-university collaborative projects encompassing proposal writing, patent analysis, and project design
  1. Kuraray Co., Ltd. (Japan): Development of Mediators for Controlled/Living Radical Polymerization of Vinyl Acetate
  2. Chang Chun Group (Taiwan): Block Copolymers for Epoxy Toughening
  3. Everlight Chemicals, Inc. (Taiwan): Block Copolymers as Pigment Dispersant for Digital Printing Inks

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**Publications**

(\*denotes equal contribution co-first authorship)

1. **Lu, R. H.-H.\***; Krishna, J.\*; Alp, Y.; Thayumanavan, S. Polymeric Lysosome-Targeting Chimeras: Extracellular Targeted Protein Degradation Without Co-Opting Lysosome-Targeting Receptors. *Nat. Commun.*, **Under Revision**
2. Liu, H.\*; **Lu, H.-H.\***; Alp, Y.; Wu, R.; Thayumanavan, S. Structural Determinants of Stimuli-Responsiveness in Amphiphilic Macromolecular Nano-Assemblies. *Prog. Polym. Sci.* **2024**, 148, 101765.
3. Chang, I.-H.; **Lu, H.-H.**; Ping, H.; Chang, C.-W.; Peng, C.-H. Versatile Cobalt(Salen-NEt<sub>2</sub>) for Aqueous Cobalt-mediated Radical Polymerization. *J. Chin. Chem. Soc.* **2023**, 70 (5), 1076–1086.
4. Lee, T.-Y.\*; **Lu, H.-H.\***; Cheng, H.-T.\*; Huang, H.-C.; Tsai, Y.-J.; Chang, I.-H.; Tu, C.-P.; Chung, C.-W.; Lu, T.-T.; Peng, C.-H.; Chen, Y. Delivery of Nitric Oxide with a pH-Responsive Nanocarrier for the Treatment of Renal Fibrosis. *J. Control Release* **2023**, 354, 417–428.
5. **Lu, H.-H.\***; Liu, H.-W.\*; Dinh, T. K.; Huang, C.-H.; Huang, H.-C.; Tseng, Y.-C.; Ku, M.-H.; Wang, F.-S.; Chen, Y.; Peng, C.-H. pH-Responsive, Two-in-One Doxorubicin and Bcl-2 siRNA-Loaded Micelleplexes for Triple-Negative Breast Cancer Therapy. *Polym. Chem.* **2022**, 13 (39), 5568–5578.
6. Liu, H.; **Lu, H.-H.**; Zhuang, J.; Thayumanavan, S. Three-Component Dynamic Covalent Chemistry: From Janus Small Molecules to Functional Polymers. *J. Am. Chem. Soc.* **2021**, 143 (49), 20735–20746.
7. **Lu, H.-H.**; Huang, C.-H.; Shiue, T.-Y.; Wang, F.-S.; Chang, K.-K.; Chen, Y.; Peng, C.-H. Highly Efficient Gene Release in Spatiotemporal Precision Approached by Light and pH Dual Responsive Copolymers. *Chem. Sci.* **2019**, 10, 284–292.
8. Chen, Y.-H.; **Lu, H.-H.**; Li, J.-Q.; Peng, C.-H. Catalytic Chain Transfer Polymerization and Reversible Deactivation Radical Polymerization of Vinyl Acetate Mediated by Cobalt(II) Phenoxy-Imine Complexes. *ACS Symp. Ser.* **2018**, 1284, 335–348.
9. Wang, F.-S.; Wang, T.-F.; **Lu, H.-H.**; Ao-Ieong, W.-S.; Wang, J.; Chen, H.-L.; Peng, C.-H. Highly Stretchable Free-Standing Poly(acrylic acid)-*block*-Poly(vinyl alcohol) Films Obtained from Cobalt-Mediated Radical Polymerization. *Macromolecules* **2017**, 50, 6054–6063.

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**Patents**

1. Thayumanavan, S., **Lu, H.-H.**, Krishna, J. Lysosome-Targeting Chimeras and Methods of Use. (Application No.: 63/550,832)
2. Peng, C.-H., **Lu, H.-H.** U. S. Pat. Appl. Publ. (2020) US 2020/0131357 A1
3. Peng, C.-H., **Lu, H.-H.** U. S. Pat. Appl. Publ. (2020) US 2020/0197320 A1

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**Awards**

**2025**      **Translational Seed Awards** (\$100,000 USD), provided by Manning Family Foundation, the US NSF Accelerating

Research Translation program, and the Institute for Applied Life Sciences Seed Fund program, UMass Amherst

**2025**     **Acorn Innovation Grant Awards** (\$36,000 USD), MassVentures

**2025**     **Travel Award**, Department of Chemistry, University of Massachusetts-Amherst

**2025**     **Travel Award**, UMass Biotechnology Training Program

**2024**     **The Tech Challenge**, 3<sup>rd</sup> Place (\$2,000 USD), Berthiaume Center for Entrepreneurship, UMass Amherst

**2022**     **NIH-UMass Biotechnology Training Program Fellowship** (National Institute of Health, T32 GM135096)