

Crystal K. Chu

Contact Information:

Address	Seeley G. Mudd Building 6 East Packer Avenue Bethlehem, PA 18015	Phone	610.758.3452 (work)
		Email	ckc221@lehigh.edu

Current Appointment:

2021–present **Assistant Professor, Lehigh University**
Department of Chemistry

Education:

2012–2017 **Ph.D. in Chemistry, California Institute of Technology**
Advisor: Prof. Robert H. Grubbs
“Advances in Selectivity and Reactivity in Transition Metal Catalysis: Carbon–Silicon Bond Formation, Wacker Oxidation, and Olefin Metathesis”

2008–2012 **B.S. in Chemistry, University of California, Berkeley**

Research Experience:

2017–2021 **NIH Postdoctoral Fellow**
Massachusetts Institute of Technology
David H. Koch Institute for Integrative Cancer Research
Department of Chemical Engineering
Advisors: Prof. Robert Langer and Prof. Daniel G. Anderson

- Synthesis of fibrous biomaterials from dynamic polymer networks
- Chemically-responsive drug delivery systems for type 1 diabetes
- Design of synthetic lectin mimics for selective glucose recognition

2012–2017 **Graduate Research Assistant**
California Institute of Technology
Division of Chemistry and Chemical Engineering

2014–2017 *Advisor: Prof. Robert H. Grubbs*

- Anti-Markovnikov selectivity in oxidations of olefins

- Ligand design for novel ruthenium olefin metathesis catalysts
 - Photonic crystals from brush block copolymers
- 2012–2014 *Advisor: Prof. Gregory C. Fu*
- Nickel-catalyzed carbon–silicon bond formation
- 2009–2012 **Undergraduate Research Assistant**
University of California, Berkeley
College of Chemistry
- 2010–2012 *Advisor: Prof. Jean M. J. Fréchet*
- Acetalated dextran polymers for controlled release of siRNA
 - Isoindigo-based materials for organic electronics
- 2009–2010 *Advisor: Prof. Michelle C. Chang*
- Biosynthetic carbon–fluorine bond formation
- 2009 **Summer Undergraduate Intern**
University of Texas, Medical Branch
Department of Biochemistry and Molecular Biology
Advisor: Prof. Sarita K. Sastry
- Protein expression associated with colon cancer cell motility

Publications:

1. **Chu, C. K.**; Baxamusa, S.; Witherel, C., Guest Editors. “Impact of COVID-19 on Materials Science Research Innovation and Related Pandemic Response,” *MRS Bull.* **2021**, *46*, 1–6.
2. **Chu, C. K.**; Joseph, A. J.; Limjoco, M. D.; Yang, J.; Bose, S.; Thapa, L. S.; Langer, R.; Anderson, D. G. “Chemical Tuning of Fibers Drawn from Extensible Hyaluronic Acid Networks,” *J. Am. Chem. Soc.* **2020**, *142*, 19715–19721.
3. Liberman-Martin, A. L.; Chang, A. B.; **Chu, C. K.**; Siddique, R. H.; Lee, B.; Grubbs, R. H. “Processing Effects on the Self-Assembly of Brush Block Polymer Photonic Crystals,” *In Preparation*.
4. **Chu, C. K.**; Lin, T.-P.; Shao, H.; Liberman-Martin, A. L.; Liu, P.; Grubbs, R. H. “Disentangling Ligand Effects on Metathesis Catalyst Activity: Experimental and Computational Studies of Ruthenium–Aminophosphine Complexes,” *J. Am. Chem. Soc.* **2018**, *140*, 5634–5643.

5. Liberman-Martin, A. L.; **Chu, C. K.**; Grubbs, R. H. "Application of Bottlebrush Block Copolymers as Photonic Crystals," *Macromol. Rapid Commun.* **2017**, *38*, 1700058.
 - Featured in Advanced Science News
 - Most Accessed 11/2016 – 10/2017
6. **Chu, C. K.**; Ziegler, D. T.; Carr, B. M.; Wickens, Z. K.; Grubbs, R. H. "Direct Access to β -Fluorinated Aldehydes by Nitrite-Modified Wacker Oxidation," *Angew. Chem. Int. Ed.* **2016**, *55*, 8435–8439.
7. **Chu, C. K.**; Liang, Y.; Fu, G. C. "Silicon–Carbon Bond Formation via Nickel-Catalyzed Cross-Coupling of Silicon Nucleophiles with Unactivated Secondary and Tertiary Alkyl Electrophiles," *J. Am. Chem. Soc.* **2016**, *138*, 6404–6407.
8. Chen, M. S.; Niskala, J. R.; Unruh, D. A.; **Chu, C. K.**; Lee, O. P.; Fréchet, J. M. J. "Control of Polymer Packing Orientation in Thin Films through Synthetic Tailoring of Backbone Coplanarity," *Chem. Mater.* **2013**, *25*, 4088–4096.
9. Cui, L.; Cohen, J. L.; **Chu, C. K.**; Wich, P. R.; Kierstead, P. H.; Fréchet, J. M. J. "Conjugation Chemistry through Acetals toward a Dextran-Based Delivery System for Controlled Release of siRNA," *J. Am. Chem. Soc.* **2012**, *134*, 15840–15848.

Patents:

1. US Patent 10,792,651. Johns, A. M.; Herron, J. R.; Pederson, R. L.; Fiamengo, B. A.; Beerman, J. A.; Lin, T.-P.; **Chu, C. K.**; Grubbs, R. H. "Synthesis and Characterization of Ru Alkylidene Complexes," October 6, 2020.

Awards & Honors:

2020	Karches Mentorship Prize
2019	Biomedical Engineering Society Career Development Award
2018	Ruth L. Kirschstein National Research Service Award NIH F32 (NIDDK), Impact Score: 10
2018	Koch Institute Joseph C. Jeffers, Jr. Research Travel Fellowship
2017	Caltech Leadership Award – 2017 Commencement
2016	AbbVie Scholars Symposium
2015	Student Poster Competition Winner Pacifichem, The International Chemical Congress of Pacific Basin Societies

2013	Patricia G. Beckman Endowed Graduate Fellowship, Caltech
2012	Commencement Student Speaker, UC Berkeley College of Chemistry
2012	Hypercube Scholar Award, UC Berkeley College of Chemistry
2010	T. Dale Stuart Scholarship for Community Service
2009–2012	National Society of Collegiate Scholars, Berkeley Chapter

Courses:

2021	Physical Organic Chemistry (CHM 458: Special Topics in Organic Chemistry, Lehigh)
2022	Organic Polymer Science (CHM 458: Special Topics in Organic Chemistry, Lehigh)

Professional Activities & Service:

2022	Discussion Leader, Tosoh Polymer Conference
2020–2021	Guest Editor, <i>MRS Bulletin</i> September 2021 Special Issue on Impact of COVID-19 on Materials Science Research Innovation <ul style="list-style-type: none">• Invite authors, review articles, and edit issue of 6 publications• Collaborate with guest editors and publish introductory article
2018–2021	Seminar Series Coordinator MIT Koch Institute Langer Laboratory <ul style="list-style-type: none">• Invite and schedule speakers from universities and companies nationwide to present at a Koch Institute seminar series• Coordinate weekly seminars, host, and introduce speaker
2018–2021	POWER Board Member MIT Postdoctoral Organization for Women Engaged in Research <ul style="list-style-type: none">• Organize seminars that provide professional development support• Host social and networking events
2016	Conference Chaperone and Volunteer Pasadena Tech Savvy Girls' Science Day STEM Conference
2015	Science Demo and Laboratory Tour Guide Caltech Women in STEM Weekend for high school athletes
2012–2014	Caltech Volunteer Tutor Caltech Y RISE Program <ul style="list-style-type: none">• On-campus tutoring for high school students in math and science 4h/wk

- 2010 **National Chemistry Week Committee Chair**
Alpha Chi Sigma, Berkeley Chapter
- Coordinated family science night at a local elementary school
 - Organized volunteers for first Cal Science & Engineering Festival (exhibition of UC Berkeley research)

Teaching & Mentoring Experience Prior to 2021:

- 2018–2021 **Postdoctoral Mentor**
Massachusetts Institute of Technology, Koch Institute
- Subha Baniya* (Research Assistant II)
Alby Joseph (MIT Undergraduate Student)
Owen Lei (Summer Visiting Student from HKUST)
Matthew Limjoco (Currently Bioinformatics Analyst, MSKCC)
Lavanya Thapa (Currently Senior Research Associate, Senda Biosciences)

- 2015–2016 **Graduate Laboratory Assistant**
California Institute of Technology, Liquids NMR Facility
- Instrument training sessions for student and postdoctoral researchers
 - Routine spectrometer maintenance

- 2015 **Graduate Student Mentor**
California Institute of Technology, Chemistry
- Jacob Sertich* (Summer Visiting Student from Occidental College)

- 2012–2015 **Graduate Teaching Assistant**
California Institute of Technology, Chemistry
- General Chemistry (Ch 1a), recitations and office hours
 - Organic Chemistry II, III (Ch 41bc), recitations and office hours
 - Organic Chemistry Lab (Ch 4a), laboratory modules and office hours

Conference & Symposium Presentations:

1. **Chu, C. K.** "Bioinspired Polymer Fibers." National Chemical Engineering Seminar Series, *November 20, 2020*, invited seminar.
2. **Chu, C. K.** "Bioinspired Polymer Fibers." Virtual Seminars in Biomedical Science, *November 19, 2020*, invited seminar.

3. **Chu, C. K.**; Joseph, A. J.; Limjoco, M. D.; Yang, J.; Bose, S.; Langer, R. S.; Anderson, D. G. "Mechanically Tunable Polymer Fibers from Extensible, Dynamic Hyaluronic Acid Networks." US-Japan Symposium on Drug Delivery Systems, *December 2019*, Lahaina, HI.
4. **Chu, C. K.**; Joseph, A. J.; Limjoco, M. D.; Yang, J.; Bose, S.; Langer, R. S.; Anderson, D. G. "Polymer Fibers from Reversibly Crosslinked Polysaccharide Networks in Water." AIChE Annual Meeting, *November 2019*, Orlando, FL.
5. **Chu, C. K.**; Joseph, A. J.; Limjoco, M. D.; Bose, S.; Langer, R. S.; Anderson, D. G. "Biomimetic Polymer Fiber Production from Reversibly Crosslinked Hyaluronic Acid Networks in Water." BMES Annual Meeting, *October 2019*, Philadelphia, PA.
6. **Chu, C. K.**; Joseph, A. J.; Limjoco, M. D.; Bose, S.; Langer, R. S.; Anderson, D. G. "Biomimetic Polymer Fiber Production from Reversibly Crosslinked Hyaluronic Acid Networks in Water." Gordon Research Conference, Biomaterials and Tissue Engineering, *July 2019*, Castelldefels, Spain.
7. **Chu, C. K.**; Joseph, A. J.; Limjoco, M. D.; Bose, S.; Langer, R. S.; Anderson, D. G. "Biomimetic Polymer Fiber Production from Reversibly Crosslinked Hyaluronic Acid Networks in Water." Gordon Research Conference, Organic Reactions and Processes, *July 2019*, Stonehill College, Easton, MA.
8. **Chu, C. K.**; Lin, T.-P.; Shao, H.; Liberman-Martin, A.; Liu, P.; Grubbs, R. H. "Disentangling Ligand Effects on Ruthenium Olefin Metathesis Catalyst Activity." Inaugural BioHub Chemistry Symposium, *August 17, 2018*, Waltham, MA.
9. **Chu, C. K.**; Lin, T.-P.; Shao, H.; Liberman-Martin, A.; Liu, P.; Grubbs, R. H. "Disentangling Ligand Effects on Ruthenium Olefin Metathesis Catalyst Activity." Gordon Research Conference, Organic Reactions and Processes, *July 2018*, Stonehill College, Easton, MA.
10. **Chu, C. K.**; Ziegler, D. T.; Carr, B. M.; Wickens, Z. K.; Grubbs, R. H. "Overcoming Challenges in Selective Wacker-Type Oxidation Reactions." American Chemical Society National Meeting, Sci-Mix, *August 2016*, Philadelphia, PA.
11. **Chu, C. K.**, Ziegler, D. T.; Carr, B. M.; Wickens, Z. K.; Grubbs, R. H. "Controlling Selectivity of Palladium-Catalyzed Oxidations of Functionalized Olefins." Graduate Research Symposium, American Chemical Society Division of Organic Chemistry, *July 2016*, Bryn Mawr College, Bryn Mawr, PA.
12. **Chu, C. K.**, Ziegler, D. T.; Carr, B. M.; Wickens, Z. K.; Grubbs, R. H. "Controlling Selectivity of Palladium-Catalyzed Oxidations of Functionalized Olefins." AbbVie Scholars Symposium, *July 26, 2016*, North Chicago, IL.

13. **Chu, C. K.**, Ziegler, D. T.; Carr, B. M.; Wickens, Z. K.; Grubbs, R. H. "Direct Access to β -Fluorinated Aldehydes via Nitrite-Modified Wacker Oxidation." California Institute of Technology Board of Trustees Presentation, *January 27, 2016*, The Caltech Athenaeum, Pasadena, CA.
14. **Chu, C. K.**, Ziegler, D. T.; Carr, B. M.; Wickens, Z. K.; Grubbs, R. H. "Direct Access to β -Fluorinated Aldehydes via Nitrite-Modified Wacker Oxidation." Pacificchem, The International Chemical Congress of Pacific Basin Societies, *December 2015*, Honolulu, HI.
15. **Chu, C. K.**, Ziegler, D. T.; Carr, B. M.; Wickens, Z. K.; Grubbs, R. H. "Facile Access to β -Fluoro Aldehydes Enabled by Nitrite-Modified Wacker Oxidation." Gordon Research Conference, Organic Reactions and Processes, *July 2015*, Bates College, Lewiston, ME.
16. **Chu, C. K.**, Srinivasan, A., Sastry, S. K. "Effects of PTP-PEST on p120-Catenin Specific Isoform Expression Associated with Motility of Colon Cancer Cells." University of Texas Medical Branch, *August 2009*, Galveston, TX.