

Wonmin Choi

Ph.D., Assistant Professor
Department of Chemistry & Biochemistry
Biomolecular Science Institute
Institute of Environment
Florida International University
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EDUCATION

Northwestern University, Evanston, IL, USA 09/2015-08/2021
Ph.D., Chemistry
Research Advisor: Prof. Nathan C. Gianneschi
Thesis: "Engineered Peptide Platforms: Design, Synthesis and Application"

Seoul National University, Seoul, Korea 03/2013-02/2015
M.Sc., Chemistry
Research Advisor: Prof. Yan Lee
Thesis: "Development of novel stimuli responsive molecules for drug delivery with dual pH & light sensitivity"

Seoul National University, Seoul, Korea 03/2006-02/2013
B.Sc., Chemistry (Cum Laude)

PROFESSIONAL EXPERIENCE

Florida International University (FIU), Miami, USA 08/2025-present
Assistant Professor (Tenure-track)

Harvard Medical School/Boston Children's Hospital, Boston, MA, USA 11/2021-07/2025
Postdoctoral Research Fellow
Research Advisor: Prof. Daniel S. Kohane

AWARDS & RECOGNITION

- The BCH Anesthesia Ignition Award, Boston Children's Hospital 2024
- Brain Korea 21 Plus Fellowship, Korean Ministry of Education 2014
- Teaching Assistant Scholarship Type B, Seoul National University 2013
- Woo-jung Academic Scholarship, Woo-jung Education and Culture Foundation 2011
- Superior Academic Performance Scholarship, Seoul National University 2010

RESEARCH EXPERIENCE

Harvard Medical School/Boston Children's Hospital, Boston, MA, USA 11/2021-07/2025
Research Advisor: Prof. Daniel S. Kohane

- Developed a controllable opioid delivery system
- Developed an on-demand vaccine using light-triggerable protein hydrogel
- Developed a prolonged local anesthetic drug delivery system using protein or liposome-based hydrogels

Northwestern University, Department of Chemistry, Evanston, IL, USA 09/2015-08/2021
Research Advisor: Prof. Nathan C. Gianneschi

- Demonstrated a robust synthetic approach to prepare bioactive polypeptide brushes under mild conditions using visible light, in aqueous solution

- Established a light activable-, enzyme responsive- micellar nanoparticle with high drug loading
- Designed novel self-assembling peptide gel with pH-responsiveness using charge-conversion strategy
- Investigated enzyme resistance of peptide brush polymers with different polymer backbones
- Developed novel platform technology for peptide drug delivery for the treatment of Huntington's Disease and neovascular Age-related Macular Degeneration
- Developed therapeutic peptide brush polymers for the treatment of various disease models in collaboration with industrial companies (Zealand and Bio-Techne)
- Mentored and trained undergraduates and junior graduate students in instrument training, material characterization, and data interpretation techniques

Seoul National University, Department of Chemistry, Seoul, Korea

03/2013-02/2015

Research Advisor: Prof. Yan Lee

- Developed a dual pH-, light- sensitive small molecule for the therapeutic application
- Synthesized a cell membrane-mimic polymers with high biocompatibility

Seoul National University, Department of Chemistry, Seoul, Korea

08/2010-09/2010

Research Advisor: Prof. Jong-In Hong

- Synthesized organic materials for light-emitting diodes (LEDs)
- Synthesized organic materials for organic solar cell

PUBLICATIONS

18. G. Aizik[†], **W. Choi**[†], C. A. Ostertag-Hill, M. Torre, D. S. Kohane*. "Injectable Microparticle-Nanoliposome Hydrogel for Extended Release of Small Hydrophilic Molecules", *ACS Nano.*, **2025**, 19, 36342-36352. [[†]equally contributing first authors]
17. **W. Choi**[†], M. Fattah[†], Y. Shang[†], M. P. Thompson, K. P. Carrow, D. Hu, Z. Liu, M. M. J. Avram, K. Bailey, O. Berger, X. Qi*, N. C. Gianneschi*. "Proteomimetic Polymer Blocks Mitochondrial Damage, Rescues Huntington's Neurons, and Slows Onset of Neuropathology In Vivo", *Science Advances.*, **2024**, 10 (44), eado8307. [[†]equally contributing first authors] **Highlights:** [Northwestern Now](#), [Genetic Engineering & Biotechnology News](#), [Technology networks](#), [EurekAlert!](#), [Medical Press](#), [Neuroscience News.com](#), [News-Medical.Net](#), [Science Daily](#), [Mental Fix](#), [Digital journal](#), [BioTechniques](#), [U.S.News](#), [The Mirage](#), [HealthDay](#), [Drugs.com](#), [Reporter Health](#), [WFMZ-TV 69](#).
16. **W. Choi**, D. S. Kohane*. "Hybrid Nanoparticle – Hydrogel Systems for Drug Delivery Depots and Other Biomedical Applications.", *ACS Nano.*, **2024**, 18, 22780-22797.
15. G. Aizik, C. A. Ostertag-Hill, P. Chakraborty, **W. Choi**, M. Pan, D. V. Mankus, A. K. R. Lytton-Jean, D. S. Kohane*. "Injectable Hydrogel Based on Liposome Self-Assembly for Controlled Release of Small Hydrophilic Molecules." *Acta Biomater.*, **2024**, 183, 101-110.
14. O. Berger, **W. Choi**, C. H. Ko, M. P. Thompson, M. J. Avram, D. J. Scott, B. L. Hoare, R. Cridge, M. Wheatly, R. A. Bathgate, D. Battle, N. C. Gianneschi*. "Long-Circulating Vasoactive 1,18-Octadecanedioic Acid-Terlipression Conjugate." *ACS Pharmacol. Transl. Sci.*, **2024**, 7, 5, 1252-1261.
13. **W. Choi**, G. Aizik, C. A. Ostertag-Hill, D. S. Kohane*. "A Hybrid Nanoparticle-Protein Hydrogel for Prolonged Local Anesthesia." *Biomaterials.*, **2024**, 306, 122494.
12. **W. Choi**[†], A. K. Nensel[†], S. Droho, M. A. Fattah, S. M-Punekar, D. I. Swygart, S. T. Burton, G. W. Schwartz*, J. A. Lavine*, N. C. Gianneschi*. "Thrombospondin-1 Proteomimetic Polymers Exhibit Anti-Angiogenic Activity in a Neovascular Age-Related Macular Degeneration Mouse Model." *Science Advances.*, **2023**, 9 (41), eadi8534. [[†]equally contributing first authors] **Highlights:** [Northwestern IIN](#), [Phys.org](#).
11. H. Sun[†], B. Qiao[†], **W. Choi**[†], N. Hampu, N. C. McCallum, M. P. Thompson, J. Oktawiec, S. Weigand, O. M. Ebrahim, M. O. de la Cruz*, N.C. Gianneschi*. "Origin of Proteolytic Stability of Peptide-Brush Polymers as Globular Proteomimetics." *ACS Cent. Sci.*, **2021**, 7, 12, 2063-2072. (Selected for Cover) [[†]equally contributing first authors]

10. A. S. Carlini*, **W. Choi**, N. C. McCallum, N. C. Gianneschi*. “pH-Responsive Charge-Conversion Progelator Peptides.” *Advanced Functional Materials.*, **2021**, 31, 2007733.
9. **W. Choi**[†], C. Battistella[†], N. C. Gianneschi*. “High Efficiency Loading of Micellar Nanoparticles with a Light Switch for Enzyme-Induced Rapid Release of Cargo.” *Biomaterials Science*, **2021**, 9, 653-657. [[†]equally contributing first authors]
8. **W. Choi**, H. Sun, C. Battistella, O. Berger, M. A. Vratsanos, M. M. Wang, N. C. Gianneschi*. “Biomolecular Densely Grafted Brush Polymers: Oligonucleotides, Oligosaccharides and Oligopeptides.” *Angew. Chem. Int. Ed.*, **2020**, 59, 2-13.
7. H. Sun[†], W. Cao[†], N. Zang[†], T. D. Clemons, G. M. Scheutz, Z. Hu, M. P. Thompson, Y. Liang, M. A. Vratsanos, X. Zhou, **W. Choi**, B. S. Sumerlin, S. I. Stupp, N. C. Gianneschi*. “Proapoptotic Peptide Brush Polymer Nanoparticles via Photoinitiated Polymerization-Induced Self-Assembly.” *Angew. Chem. Int. Ed.*, **2020**, 59, 2-9.
6. H. Sun[†], **W. Choi**[†], N. Zang, C. Battistella, M. P. Thompson, W. Cao, X. Zhou, C. Forman, N. C. Gianneschi*. “Bioactive Peptide Brush Polymers via Photoinduced Reversible-Deactivation Radical Polymerization.” *Angew. Chem. Int. Ed.*, **2019**, 58, 17359-17364. (Selected for Back Cover) [[†]equally contributing first authors]
5. H. Sun, L. Yang, M. P. Thompson, S. Schara, W. Cao, **W. Choi**, Z. Hu, N. Zang, W. Tan*, N. C. Gianneschi*. “Recent Advances in Amphiphilic Polymer-Oligonucleotide Nanomaterials via Living/Controlled Polymerization Technologies.” *Bioconjugate Chemistry*, **2019**, 30, 1889-1904.
4. K. J. Lee, K. H. Song, **W. Choi**, Y. S. Kim*. “A strategy for the separation of diterpenoid isomers from the root of *Aralia continentalis* by countercurrent chromatography: The distribution ratio as a substitute for the partition coefficient and a three- phase solvent system.” *Journal of Chromatography A*. **2015**, 224-230.
3. **W. Choi**, S. Kang, Y. Mok, E. Park, Y. Song, S. J. Choi, Y. Lee*. “Unlocking the pH-Responsive Degradability of Fumaramic Acid Derivatives Using Photoisomerization.” *Chemistry-A European Journal*, **2014**, 20, 15715-15718.
2. S. Kang, Y. Kim, Y. Song, J. U. Choi, E. Park, **W. Choi**, J. Park, Y. Lee*. “Comparison of pH-sensitive degradability of maleic acid amide derivatives.” *Bioorganic & Medicinal Chemistry Letters*, **2014**, 24, 2364-2367.
1. H. Kim, **W. Choi**, S. Lee, S. Kim, J. Ham, J. H. Seo, S. Jang, Y. Lee*. “Synthesis of biomembrane-mimic polymers with various phospholipid head groups.” *Polymer*, **2014**, 55, 517-524.

PATENT

D. S. Kohane, **W. Choi**, “HYDROGLES COMPRISING PROTEIN-STABILIZED NANOPARTICLES FOR EXTENDED RELEASE”, WO 2025128639A1.

N. C. Gianneschi, M.A. Fattah, **W. Choi**, X. Qi., “HUNTINGTIN MIMETIC PROTEIN-LIKE POLYMERS AND USES THEREOF”, US Patent, US-20240110004-A1.

O. Berger, **W. Choi**, N. C. Gianneschi, D. Batlle. “TERLIPRESSIN-OCTADECANEDIOIC ACID CONJUGATE FOR VASOCONSTRICTIVE THERAPY”, US Patent, US-20230399360-A1.

N. C. Gianneschi, J. A. Lavine, B. Zhang, O. Berger, **W. Choi**, M. M. Wang, C. Battistella, H. Sun. “BRUSH POLYMERS FOR THERAPEUTIC APPLICATIONS”, US Patent, US-20220280625-A1.

PRESENTATIONS

Oral

W. Choi. “Designing Injectable Nanoparticle–Hydrogel Hybrids for Prolonged Local Anesthetic Delivery”, *G-LAMP Symposium, Kang-Won National University, Chun Cheon, Korea, Oct 2025*.

W. Choi. “Designing Injectable Nanoparticle–Hydrogel Hybrids for Prolonged Local Anesthetic Delivery”, *Kyung Hee University School of Medicine Symposium, Seoul, Korea, Oct 2025*.

W. Choi. “Building the Next Generation of Biomaterials: My Path and Research Outlook”, *Biomolecular Science Institute Symposium, Florida International University, Miami, FL, Oct 2025.*

W. Choi, D. S. Kohane. “A Hybrid Nanoparticle-protein Hydrogel System for Prolonged Local Anesthesia”, *Association of University Anesthesiologists (AUA) meeting, Boston, MA, Mar 2025.*

W. Choi, D. S. Kohane. “A Hybrid Nanoparticle-protein Hydrogel System for Prolonged Local Anesthesia”, *Research floor meeting at Boston Children’s hospital, Boston, MA, Nov 2024.*

W. Choi, N. C. Gianneschi. “Engineered Peptide Platforms: Design, Synthesis and Application”, *Kyung Hee University School of Medicine Symposium, Seoul, Korea, Nov 2023.*

W. Choi, Y. Shang, X. Qi, N. C. Gianneschi. “Preventing Huntington's disease using protein-like polymers”, *American Chemical Society National Meeting, San Diego, CA, Aug 2019.*

W. Choi, Y. Lee. “Development of Signal Sensitive Maleic Acid Amide Derivatives”, *The 4th Joint Campus Asia Symposium, Sendai, Japan, Nov 2014.*

Poster

W. Choi, D. S. Kohane. “A Hybrid Nanoparticle-protein Hydrogel System for Prolonged Local Anesthesia”, *Association of University Anesthesiologists (AUA) meeting, Boston, MA, Mar 2025.*

W. Choi, D. S. Kohane, “Extended duration of sciatic nerve block with high dose loaded local anesthetic particle in protein hydrogel”, *Judah M. Folkman Research Day, Boston, MA, May, 2023.*

W. Choi, Y. Lee. “Unlocking the pH-Responsive Degradability of Fumaramic Acid Derivatives Using Photoisomerization”, *Korean Chemical Society National Meeting, Gwangju, Korea, Oct. 2014.*

W. Choi, Y. Lee. “Synthesis of Biomembrane-Mimic Polymer with Thiol Group for Coating of Gold Nanoparticles”, *Seoul National University Undergraduate Student Research Presentation, Seoul, Korea, Dec. 2011.*

TEACHING EXPERIENCE

Teaching Assistant, Organic Chemistry Laboratory, University of California, San Diego 01/2016-12/2016

- Instructed 15-25 undergraduate students in laboratory techniques and principles
- Developed quizzes to assess student’s understanding
- Provided detailed feedback and assessment on lab reports
- Conducted lab demonstrations and safety protocols to enhance learning
- Achieved an overall rating of “excellent” on student review feedback

Teaching Assistant, General Chemistry, University of California, San Diego 09/2015-12/2015

- Held regular review sessions, providing comprehensive explanations, clarifying difficult concepts, and utilizing PowerPoint presentations to assist in teaching
- Developed practice quizzes for 20-50 students per quarter to assess comprehension and retention of course material.
- Assisted the professor in creating exam questions to evaluate students' understanding and application of key concepts.
- Held regular office hours to provide one-on-one academic support and address individual student concerns.
- Received an overall rating of “excellent” on student review feedback

Teaching Assistant, Biochemistry Laboratory, Seoul National University, Seoul, Korea 03/2014-06/2014

- Instructed 15-25 undergraduate students on biochemistry laboratory techniques and principles
- Designed quizzes to evaluate comprehension of biochemistry concepts
- Provided detailed feedback and assessment on biochemistry lab reports, focusing on experimental design and data analysis
- Conducted hands-on lab demonstrations showcasing biochemical experiments and techniques to enhance student learning

- Contributed to the production of online laboratory videos (Virtual Lab), PanMun Education, Inc., Korea.

Teaching Assistant, General Chemistry, Seoul National University, Seoul, Korea

03/2013-06/2013

- Conducted lecture review sessions for 10-20 undergraduate students, and graded their reports and exams

LEADERSHIP & ORGANIZATIONAL SKILLS

Local High School Outreach Visit (BioTECH), Organizer/Instructor

11/2025

Department of Chemistry & Biochemistry, Florida International University

Designed and led interactive outreach sessions for visiting students from local high school (BioTECH). Introduced fundamental concepts of hydrogels through a hands-on BSA crosslinking experiment and discussed real-world applications in biomaterials and chemistry. Guided students through experimental setup, observation, and interpretation while promoting interest in research and STEM careers.

Mug of Tea & Chat (Undergraduate Career Q&A), Panelist/Facilitator

09/2025

Department of Chemistry & Biochemistry, Florida International University

Led informal mentoring sessions for undergraduates curious about academic and graduate pathways; discussed faculty careers, PhD/MS options, applications, and research opportunities; provided feedback on CVs and statements.

Campus Asia Summer School, Staff member

08/2014

Seoul National University

Assisted in organizing professional development seminars and social events for professors and graduate student

Hokkaido University-Seoul National University Symposium, Staff member

08/2013

Seoul National University

Assisted in organizing professional development seminars and social events for professors and graduate student

17th Korean Peptide Protein Society Symposium, Staff member

09/2013

Seoul National University

Assisted in organizing professional development seminars and events for professors

3rd Campus Asia Symposium, Staff member

08/2013

Seoul National University

Assisted in organizing professional development seminars and events for professors