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Professional Experience

- 2014 Feb – present **Associate Professor** (2019 Sep – present)
Assistant Professor (2014 Feb – 2019 Aug)
Department of Materials Science and Engineering (1st affiliation)
Department of Biomedical Engineering (2nd affiliation)
Ulsan National Institute of Science and Technology (**UNIST**), Rep. of Korea
- 2012 Apr – 2014 Jan **Research Fellow**
Department of Medicine, Brigham and Women's Hospital
Harvard Medical School, USA

Education

- 2007 Aug – 2011 Dec **Ph.D. – Chemistry**
University of Illinois, Urbana-Champaign (**UIUC**), USA
(Advisor: Prof. Hyunjoon Kong, Chemical and Biomolecular Engineering)
- 2001 Mar – 2007 Aug **B. S. (Magna Cum Laude) – Chemistry**
Korea Advanced Institute of Science and Technology (**KAIST**), Rep. of Korea
(Advisor: Prof. Byong-Seok Choi, Chemistry)

Society Membership & Editorship

- 2022 – present **Associate Editor**
Frontiers in Bioengineering and Biotechnology, Frontiers in Materials
(Biomaterials section)
- 2022 – present **Editorial Board**
Biomedical Technology
- 2021 – present **Young Investigator Board Member**
Korean Tissue Engineering and Regenerative Medicine Society

- 2017 – present **Associate Editor** (2021 – present), **Publishing Editor** (2019 – 2020),
Editorial Board Member (2017 – 2018)
Macromolecular Research
- 2016 – present **Professional Director (Nano-Bio Division)** (2022-present),
Academic Board Member (2016-2021)
The Korean Society for Biomaterials

Awards & Honors

- 2022 Apr **MEDIPOST Young Scientist Award**
Korea Tissue Engineering and Regenerative Medicine Society
- 2021 Nov **MIWON COMMERCIAL CO. Young Scientist Award**
The Korea Society of Industrial and Engineering Chemistry
- 2020 Nov **PHI BIOMED Young Investigator Award**
The Korean Society for Biomaterials
- 2016 May **Best Presentation Award**
Materials Research Society of Korea
- 2015 Oct **Young Scientist Award**
Korea-China Young Scientist Exchange Program
The Korean Society for Biomaterials
- 2010 Aug – 2011 Aug **Harry G. Drickamer Graduate Fellowship**
Department of Chemistry, UIUC

Publications (International Journals)

(*: Corresponding author, †: Equal contribution, _____: contribution from Cha lab)

● **In UNIST (2015~)**

60. K. Lee†, Y. Noh†, Y. Bae, S. Kang*, **C. Cha*** Programmable control of physicochemical and drug release properties of in situ forming thermoresponsive elastin-like polypeptide hydrogels. *Biomacromolecules* **2022**, 23, 5193-5201.
59. R. I. Saleh, M. Kim, S. Y. Baek, **C. Cha*** Chitosan-functionalized silica nanoparticles as a multifunctional coating material for improved water repellency, antimicrobial activity and mechanical strength of degradable bioplastics. *Cellulose* **2022**, 29, 7691-7701.
58. J. Hong†, J. Han†, **C. Cha*** Precision control of programmable actuation of thermoresponsive nanocomposite hydrogels with multilateral engineering. *Int. J. Mol. Sci.* **2022**, 23, 5044.
57. M. Kim†, C. Choi†, J. Lee†, J. Kim*, **C. Cha*** Multiscale engineering of nanofiber-aerogel composite nanogenerator with tunable triboelectric performance based on multifunctional polysuccinimide. *Small* **2022**, 2107316.

56. J. Hong, Y. Kwon, M. S. Kwon*, C. Cha* Aziridine-capped poly(ethylene glycol) brush copolymer with tunable architecture as a versatile crosslinker for adhesives. *ACS Appl. Polym. Mater.* **2022**, 4, 2105–2115.
55. R. I. Saleh[†], M. Kim[†], C. Cha* Comprehensive enhancement of mechanical, water-repellent and antimicrobial properties of regenerated seaweed and plant-based paper with chitosan coating. *Coatings* **2021**, 11, 1384.
54. S. Kim[†], C. Choi[†], C. Cha* Mechanotopography-driven design of dispersible nanofiber-laden hydrogel as a 3D cell culture platform for investigating tissue fibrosis. *Adv. Healthc. Mater.* **2021**, 10, 2101109
53. F. Kim[†], S. E. Yang[†], H. Ju[†], S. Choo, J. Lee, G. Kim, S.-h Jung, S. Kim, C. Cha, K. T. Kim, S. Ahn, H. G. Chae*, J. S. Son* Direct ink writing of 3D thermoelectric architectures for fabrication of micro power generators. *Nat. Electron.* **2021**, 4, 579–587.
52. S. Kim[†], M. R. Park[†], J. B. Kim*, C. Cha* Synergistic control of mechanics and microarchitecture of 3D bioactive hydrogel platform to promote the regenerative potential of engineered hepatic tissue. *Biomaterials* **2021**, 270, 120688.
51. J. Hong[†], Y. Shin[†], J. Lee*, C. Cha* Programmable multilayer printing of mechanically-tunable 3D hydrogel co-culture system for investigating complex cellular behavior. *Lab Chip* **2021**, 21, 710-718.
50. C. Choi[†], S. Kim[†], C. Cha* Synergistic control of mechanics and microarchitecture of 3D bioactive hydrogel platform to promote the regenerative potential of engineered hepatic tissue. *Carbohydr. Polym.* **2021**, 252, 117128.
49. M. Kim, C. Cha* Graft architecture guided simultaneous control of degradation and mechanical properties of in situ forming and fast dissolving polyaspartamide hydrogels. *Biomacromolecules* **2020**, 21, 3693–3703.
48. K. Lee, C. Cha* Advanced polymer-based bioink technology for printing soft biomaterials. *Macromol. Res.* **2020**, 28, 689-702.
(# Cover issue)
47. D. Lee, C. Cha* Cell subtype-dependent formation of breast tumor spheroids and their variable responses to chemotherapeutics within microfluidics-generated 3D microgels with tunable mechanics. *Mater. Sci. Eng. C* **2020**, 112, 110932.
46. H. Kim, C. Song, C. Cha*, J. Jung*, J. Oh* Refined fabrication of mechano-stimulating micro-platform for on-chip analyses of complex platelet behavior. *J. Ind. Eng. Chem.* **2020**, 84, 269-279.
45. S. Kim, C. Cha* Enhanced mechanical and electrical properties of heteroscaled hydrogels infused with aqueous-dispersible hybrid nanofibers. *Biofabrication* **2020**, 12, 015020.
44. M. Kim[†], Y. Ahn[†], K. Lee, W. Jung*, C. Cha* In situ facile-forming chitosan hydrogels with tunable physicochemical and tissue adhesive properties by polymer graft architecture. *Carbohydrate Polym.* **2020**, 229, 115538.
43. H.-H. Park, K. Sun, D. Lee, M. Seong, C. Cha, H. E. Jeong* Cellulose acetate nanoneedle array covered with phosphorylcholine moiety as a biocompatible and sustainable antifouling material. *Cellulose* **2019**, 26, 8775-8788.
42. K. Lee, S. Choi, C. Kim, W. Kang, W. Son, S. C. Bae*, J.-W. Oh*, S. Lee*, C. Cha* Implementation of combinatorial genetic and microenvironmental engineering to microbial-based field-deployable microbead biosensors for highly sensitive and remote chemical detection. *ACS Sens.* **2019**, 4, 2716-2723.
41. Y. Jang, M. Lee, H. Kim, C. Cha*, J. Jung*, J. Oh* Comprehensive tuning of bioadhesive properties of polydimethylsiloxane (PDMS) membranes with controlled porosity. *Biofabrication* **2019**, 11, 035021.
40. S. Kim, H. Kim, T. Qiao, C. Cha, S. K. Lee, K. Lee, H. J. Ro, Y. Kim, W. Lee, H. Lee* Fluorescence enhancement from nitro-compounds sensitive bacteria within spherical hydrogel scaffolds. *ACS Appl. Mater. Interfaces* **2019**, 15, 14354-14361.

39. J. Hong, Y. Shin, S. Kim, J. Lee*, C. Cha* Complex tuning of physical properties of hyperbranched polyglycerol-based bioink for microfabrication of cell-laden hydrogels. *Adv. Funct. Mater.* **2019**, *29*, 1808750.
 38. Y. Jang†, C. Cha†, J. Jung*, J. Oh* Interfacial compression-dependent merging of two miscible microdroplets in an asymmetric cross-junction for in situ microgel formation. *Macromol. Res.* **2018**, *26*, 1143-1149.
 37. D. Lee, K. Lee, C. Cha* Microfluidics-assisted fabrication of microtissues with tunable physical properties for developing in vitro multiplex tissue model. *Adv. Biosys.* **2018**, *2*, 1800236.
 36. Y. Jang†, C. Cha†, J. Jung*, J. Oh* Interfacial compression-dependent merging of two miscible microdroplets in an asymmetric cross-junction for in situ microgel formation. *Macromol. Res.* **2018**, *26*, 1143-1149.
 35. M. Kim, C. Cha* Integrative control of mechanical and degradation properties of in situ crosslinkable polyamine-based hydrogels for dual-mode drug release kinetics. *Polymer* **2018**, *145*, 272-280.
 34. H. Yi, K. Sun, I. Hwang, K. Lee, C. Cha, T.-i. Kim, H. E. Jeong* Wet-responsive, reconfigurable, and biocompatible hydrogel adhesive films for transfer printing of nanomembranes. *Adv. Funct. Mater.* **2018**, *28*, 1706498.
 33. M. Kim, C. Cha* Modulation of functional pendant chains within poly(ethylene glycol) hydrogels for refined control of protein release. *Sci Rep.* **2018**, *8*, 4315.
 32. J. Jang, C. Cha* Multivalent polyaspartamide crosslinker for engineering cell-responsive hydrogels with degradation behavior and tunable physical properties. *Biomacromolecules* **2018**, *19*, 691-700.
 31. K. Lee, J. Hong, H. J. Roh, S. H. Kim, H. Lee, S. K. Lee, C. Cha* Dual ionic crosslinked interpenetrating network of alginate-cellulose beads with enhanced mechanical properties for biocompatible encapsulation. *Cellulose* **2017**, *24*, 4963-4979.
 30. M. Kim†, J. Jang†, C. Cha* Carbon nanomaterials as versatile platforms for theranostic applications. *Drug Discover. Today* **2017**, *22*, 1430-1437.
 29. S. Kim, S. B. Sim, K. Lee, C. Cha* Comprehensive examination of mechanical and diffusional effects on cell behavior using a decoupled 3D hydrogel system *Macromol. Biosci.* **2017**, *17*, 1700162.
 28. J. Jang, J. Hong, C. Cha* Effects of precursor composition and mode of crosslinking on mechanical properties of graphene oxide reinforced composite hydrogels. *J. Mech. Behav. Biomed. Mater.* **2017**, *69*, 282-293.
 27. S. Kim†, K. Lee†, C. Cha* Refined control of thermoresponsive swelling/deswelling and drug release properties of poly(N-isopropylacrylamide) hydrogels using hydrophilic polymer crosslinkers *J. Biomater. Sci. Polym. Ed.* **2016**, *27*, 1698-1711.
 26. S. Kim†, J. Oh†, C. Cha* Enhancing the biocompatibility of microfluidics-assisted fabrication of cell-laden microgels with channel geometry. *Colloids Surf. B Biointerfaces* **2016**, *147*, 1-8.
 25. C. Cha, J. H. Jeong*, H. Kong* Poly(ethylene glycol)-poly(lactic-co-glycolic acid) core-shell microspheres with enhanced controllability of drug encapsulation and release rate. *J. Biomater. Sci. Polym. Ed.* **2015**, *26*, 828-840.
- **In BWH (2012~2014)**
24. C. Cha, P. Soman, W. Zhu, M. Nikkhah, M. G. Camci-Unal, S. Chen*, A. Khademhosseini* Structural reinforcement of cell-laden hydrogels with microfabricated three dimensional scaffolds. *Biomater. Sci.* **2014**, *2*, 703-709.
 23. C. Cha†, J. Oh†, K. Kim, Y. Qiu, M. Joh, S. R. Shin, X. Wang, G. Camci-Unal, K.-t. Wan, R. Liao, A. Khademhosseini* Microfluidics-assisted fabrication of gelatin-silica core-shell microgels for injectable tissue constructs. *Biomacromolecules* **2014**, *15*, 283-290.
(# Chosen as an ACS Editors' Choice article)

22. **C. Cha**, S. R. Shin, X. Gao, N. Annabi, M. R. Dokmeci, X. Tang, A. Khademhosseini* Controlling mechanical properties of cell-laden hydrogels by covalent incorporation of graphene oxide. *Small* **2014**, 10, 514-523.
 21. N. Annabi, A. Tamayol, J. A. Uquillas, M. Akbari, L. Bertassoni, **C. Cha**, G. Camci-Unal, M. R. Dokmeci, N. A. Peppas*, A. Khademhosseini* 25th Anniversary article: Rational design and application of hydrogels in regenerative medicine. *Adv. Mater.* **2014**, 26, 85-124.
 20. **C. Cha**, S. R. Shin, N. Annabi, M. R. Dokmeci, A. Khademhosseini*, Carbon-based nanomaterials: multifunctional nanomaterials for biomedical engineering. *ACS Nano* **2013**, 7, 2891-2897.
 19. **C. Cha**, J. Oh* An optofluidic mechanical system for elasticity measurement of thin biological tissues. *Biotech. Lett.* **2013**, 35, 825-830.
 18. J. Oh†, K. Kim†, S. W. Won, **C. Cha**, A. Gaharwar, Š. Selimović, H. Bae, K. H. Lee, D. H. Lee, S.-H. Lee, A. Khademhosseini* Microfluidic fabrication of cell adhesive chitosan microtubes. *Biomed. Microdevices* **2013**, 15, 465-472.
(# Highlighted as a 'Hot Paper' by the Editors)
 17. **C. Cha**, W. B. Liechty, A. Khademhosseini, N. A. Peppas* Designing biomaterials to direct stem cell fate. *ACS Nano* **2012**, 6, 9353-9358.
- **In UIUC (2009~2013)**
16. J. J. Schmidt†, J. H. Jeong†, V. Chan, **C. Cha**, K. Baek, M.-H. Lai, R. Bashir, H. Kong, H* Tailoring the dependency between rigidity and water uptake of a microfabricated hydrogel with the conformational rigidity of a polymer cross-linker. *Biomacromolecules* **2013**, 14, 1361-1369.
 15. **C. Cha**, E. Antoniadou, M. Lee, J. H. Jeong, W. Ahmed, T. A. Saif, S. A. Boppart, H. Kong* Tailoring hydrogel adhesion to polydimethylsiloxane substrate using polysaccharide glue. *Angew. Chem. Int. Ed.* **2013**, 52, 6949-6952.
 14. J. H. Jeong, Y. Liang, M. Jang, **C. Cha**, C. Chu, H. Lee, W. G. Jung, J. W. Kim, S. A. Boppart, H. Kong* Stiffness-modulated water retention and neovascularization of dermal fibroblast-encapsulating collagen gel. *Tissue Eng.* **2013**, 19, 1275-1284.
 13. E. An, C. B. Jeong, **C. Cha**, D. H. Kim, H. Lee, H. Kong, J. Kim, J. W. Kim* Fabrication of microgel-in-liposome particles with improved water retention. *Langmuir* **2012**, 28, 4095-4101.
 12. J. H. Jeong†, V. Chan†, **C. Cha**, P. Zolutuna, C. Dyck, K. Shia, R. Bashir*, H. Kong* "Living" Microvascular stamp for patterning of functional neovessels; orchestrated control of matrix property and geometry. *Adv. Mater.* **2012**, 24, 58-63.
(*Cover Issue)
 11. J. H. Jeong, **C. Cha**, J. Haan, A. Kaczmarowski, S. Oh, H. Kong* Polyaspartamide vesicle induced by metallic nanoparticles. *Soft Matter* **2012**, 8, 2237-2242.
 10. **C. Cha**, S. R. Kim, Y.-S. Jin*, H. Kong* Tuning structural durability of yeast-encapsulating alginate gel beads with interpenetrating networks for sustained bioethanol production. *Biotechnol. Bioeng.* **2012**, 109, 63-73.
(*Highlighted as a "Spotlight Feature" by the Editors)
 9. Y. Liang†, J. H. Jeong†, R. J. DeVolder, **C. Cha**, F. Wang, Y. W. Tong*, H. Kong* A cell-instructive hydrogel to regulate malignancy of 3D tumor spheroids with matrix rigidity. *Biomaterials* **2011**, 32, 9308-9315.
 8. **C. Cha**, J. H. Jeong, X. Tang, A. T. Zill, Y. S. Prakash, S. C. Zimmerman, T. A. Saif, H. Kong* Top-down synthesis of versatile polyaspartamide linkers for single-step protein conjugation to organic and inorganic materials. *Bioconjugate Chem.* **2011**, 22, 2377-2382. (Link)
 7. **C. Cha**, J. H. Jeong, J. Shim, H. Kong* Tuning the dependency between stiffness and permeability of cell-encapsulating hydrogel with hydrophilic pendant chains. *Acta Biomater.* **2011**, 7, 3719-3728.

6. **C. Cha**, E.-S. Kim, I. Kim, H. Kong* Integrative design of a poly(ethylene glycol)-poly(propylene glycol)-alginate hydrogel to control three dimensional biomineralization. *Biomaterials* **2011**, 32, 2695-2703.
5. Y. Liang, T. W. Jensen, E. J. Roy, **C. Cha**, R. J. DeVolder, R. E. Kohman, B. Z. Zhang, K. B. Textor, L. A. Rund, L. B. Schook, Y. W. Tong*, H. Kong* Tuning the non-equilibrium state of a drug-encapsulated poly(ethylene glycol) hydrogel for stem and progenitor cell mobilization. *Biomaterials* **2011**, 32, 2004-2012.
4. J. H. Jeong†, J. J. Schmidt†, **C. Cha**, H. Kong* Tuning responsiveness and structural integrity of the pH responsive hydrogel using poly(ethylene glycol) cross-linker. *Soft Matter* **2010**, 6, 3930-3938.
3. **C. Cha**, S. Y. Kim, L. Cao, H. Kong* Decoupled control of stiffness and permeability with a cell-encapsulating poly(ethylene glycol) dimethacrylate hydrogel. *Biomaterials* **2010**, 31, 4864-4871.
(*Highlighted in IEEE Reviews of Biomedical Engineering (vol. 3, 2010))
2. R. E. Kohman, **C. Cha**, S. C. Zimmerman*, H. Kong* Tuning hydrogel properties and function using substituent effects. *Soft Matter* **2010**, 6, 2150-2152.
1. **C. Cha**, R. E. Kohman, H. Kong* Biodegradable polymer crosslinker: Independent control of stiffness, toughness, and hydrogel degradation rate. *Adv. Funct. Mater.* **2009**, 19, 3056-3062.