

Chiroptical Materials for AI-Healthcare Platforms

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Abstract

This talk focuses on the development of advanced chiroptical materials for AI-driven healthcare applications. By leveraging the unique optical properties of chiral nanostructures, such as circular dichroism and optical rotation, her work aims to create precise diagnostic tools and innovative therapeutic platforms. These materials enable selective interactions with biological molecules, facilitating the early detection of diseases, including cancers and degenerative disorders. Integrating chiroptical materials with artificial intelligence, Our group has developed bio big data libraries and optimized AI algorithms to enhance diagnostic accuracy and predictive capabilities. This interdisciplinary approach paves the way for groundbreaking advancements in personalized medicine, offering novel solutions for real-time monitoring, targeted therapies, and improved patient outcomes.

Keywords: AI, Healthcare, Chirality, Chiroptical, Nanomaterials

CURRICULUM VITAE



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Previous Career

[Post-Doc]	2017-2020	Massachusetts Institute of Technology (MIT), Chemical Engineering
[Doctorate]	2017	University of Michigan, Ann Arbor, MI, Macromolecular Science and Engineering
[Researcher]	2010-2011	Argonne National Lab., Chicago, IL, Materials Divisions
[Bachelor]	2009	KAIST, Materials Science and Engineering



Current Position

2020-Present	Korea Advanced Institute of Science and Technology (KAIST) Assistant Professor , Materials Science and Engineering Adjunct Professor, Biological Sciences Adjunct Professor, KAIST Institute for the NanoCentury Adjunct Professor, KAIST Health Institute
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Selected Publications

1. J. Kwon, ..., J. Yeom*, Controllable Chiral Lattices for 2D ROA Mapping and a Long-term Stable Broadband CPL Detector, *Preprint at Research Square*, 2024
2. M.Kang, I.Hwang, ..., J. Yeom*, B.Park*, Room temperature chiral magnetoresistance in a chiralperovskite-based perpendicular spin valve, *APL Materials*, 12, 081118, 2024
3. W. Jung, ..., J. Yeom*, Universal Chiral Nanopaint for Metal Oxide Biomaterials, *Under revision*
4. J.Son, W. Jung, ..., J. Jung*, J. Yeom*, Chirality-Controlled Lipid Nanoparticles for mRNA Delivery, *In preparation*
5. J.Kwon,...,J.Yeom*, Defect-engineered QDs for electrooptical processors, *Under revision*
6. I. J. Jung, ... , J. Yeom*, Multiscale Chiral Synthesis via Self-Assembly of Achiral Nanoparticles for Next-Generation Chiral Material-Based Applications: The Role of Metal Ions as Chirality Messengers, **ACS Appl. Nano Mater.** 6, 21, 19632–19638, 2023
7. M. Kim, ... , J. Yeom*, D. Kim*, Bespoke selenium nanowires with comprehensive piezo-phototronic effects as viable p-type semiconductor-based piezo-photocatalysts, 108680, **Nano Energy**, 2023
8. J. Kwon, ... , N. Kotov*, J. Yeom*, Chiral Spectroscopy of Nanostructures, 15229-15237, **Acc. Chem. Res.**, 2023
9. J. Kwon, ... , J. Lee*, S. Vignolini*, J. Yeom*, Chiral Se nanobrooms with wavelength and polarization sensitive scattering 2300927, **Adv. Func. Mater.**, 2023.
10. W. Jung, ... , J. Yeom*, Chiral biomaterials for nanomedicines: from molecules to supraparticles, **Pharmaceutics**, 14, 9, 1-29, 2022.
11. J. Kwon, ... , N. A. Kotov*, J. Yeom*, Recent advances in chiral nanomaterials with unique electric and magnetic properties, **Nano Convergence**, 9, 32, 2022.