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Summary
Postdoctoral scientist specializing in nanotechnology for healthcare applications. My research focuses on the use of molecularly imprinted polymers as bio-inspired synthetic receptors for biomolecular recognition and therapeutic targeting, and the development of chemically modified single-walled carbon nanotube-based sensors for integration into machine learning-enabled diagnostic platforms. Authored 18 peer-reviewed publications, including 8 as first author and 6 as corresponding author, and 3 patents.

EDUCATION AND TRAINING

Postdoctoral Research Scholar in Molecular Pharmacology Program Apr. 2023-Present
Memorial Sloan Kettering Cancer Center, New York, NY
Advisor: Dr. Daniel Heller

Ph.D. in Chemistry Oct. 2018-Dec. 2022
Imperial College London, UK.
Thesis: *Molecularly Imprinted Polymers: Applications in Cancer Diagnostics and Treatment*
Advisors: Prof. Alan Spivey, Prof. Eric Aboagye

MSci in Chemistry Oct. 2014-Jun. 2018
Imperial College London, UK.

RESEARCH EXPERIENCE

Postdoctoral Research Fellow Apr. 2023–Present
Daniel Heller Lab, Memorial Sloan Kettering Cancer Center, New York, NY

- *Research topics:* (1) Development of nanosensor platforms for cancer diagnostics; (2) Engineering new classes of quantum well defect in carbon nanotubes for biosensing applications.
- Co-Principal Investigator of the project '*Carbon Nanotube-Based Perception Sensors for ALS Diagnosis and Biomarker Discovery'*, funded for $150,000
- 2 first-author papers (*ACS Nano Letters,* and under revisions at *Nature Synthesis*), 2 in preparation.
- 2 provisional patent applications filed. One licensed to a UK-based security company, another under discussions with an MSK/MIT spinout diagnostics company.

- Developed 'handle-free' functionalization of carbon nanotubes, more than quadrupling the library of emissive quantum well defects available to nanotube chemists.
- Developed inkjet-printed nanotube microarrays for high throughput screening.
- Developed nanotube-based QR codes for security applications.
- Wrote/contributed to multiple research grants, including NIH R01 and philanthropic grants.

Graduate Student
Prof. Alan Spivey and Prof. Eric Aboagye Labs, Imperial College London, UK

- *Research topics:* (1) Development of molecularly imprinted polymer nanoparticles (nanoMIPs) for cancer targeting; (2) Developing MIP-based biomarker discovery platform; (3) Assessing biocompatibility of nanoMIPs.
- 8 papers of which 6 were first or corresponding author.

- Developed 'Snapshot Imprinting' biomarker discovery technique, applied to both cancer cell culture and biopsy tissue samples.
- Demonstrated MIP biocompatibility via favorable biodistribution (entering each tissue tested including passing the blood-brain-barrier), clearance (ejected via urine and feces within 3 days) and low toxicity.
- Developed strategy for generating pharmacologically active nanoMIPs by targeting different epitopes of signaling proteins.
- Developed new approaches for solid phase synthesis of nanoMIPs based on iodosilanized surface chemistry.

SCIENTIFIC LEADERSHIP

- Core scientific member of MSK/MIT spinout Nine Diagnostics, Ltd.
- Inventor of carbon nanotube functionalization patent licensed to UK-based security company Metis Global Trading, a partnership through which MSK holds equity and board representation.
- Mentor for 4 Weill Cornell graduate students, 2 undergraduate students and 3 high school students.
- Mentored undergraduate summer students during MSK Engineering Summer Program (2024, 2025).
- Volunteering with the RockEDU Science Outreach program, a Science education and outreach initiative based at Rockefeller University in New York City Seeking to make science accessible, equitable, and engaging for high school students, particularly those from underrepresented communities.
- Taught Introductory Python Programming to graduate students at Imperial College London (2018).

GRANTS, FELLOWSHIPS AND AWARDS

- Co-Principal Investigator for an ALS Network Research Innovation Grant, project titled '*Carbon Nanotube-Based Perception Sensors for ALS Diagnosis and Biomarker Discovery'*, **$150,000** 2025
- President's PhD Scholarship, **$130,000**, Imperial College London 2018-2023
- Medical Research Council Doctoral Training Partnership, **$125,000**, Imperial College 2018-2023
- Best PhD Prize, Department of Chemistry, Imperial College London 2023
- Prize for Excellence in Health and Safety, Imperial College London 2022
- Proteintech AACR Research Grant 2021
- Wilkinson Charitable Trust Grant 2019
- Alfred Bader Prize, Imperial College London 2018
- BP Dean's Award, Imperial College London 2015
- Dean's List, Imperial College London 2014-2018

TALKS AND LECTURES

- **Piletsky, S.S.,** Engineering New Classes of Quantum Well Defects in Single-Walled Carbon Nanotubes for Diagnostic and Security Applications. *CINT Colloquium Series, Center for Integrated Nanotechnologies,* Sandia National Laboratories, Albuquerque NM, October 8, 2025.
- **Piletsky, S.S.,** Heller D.A., New Strategies for the Covalent Functionalization of Single-Walled Carbon Nanotubes Resulting in Highly Emissive Quantum Well Defects. *247th ECS Meeting,* Montréal, Canada, May 18, 2025.
- **Piletsky S.S.,** Handle-Free Functionalization of Carbon Nanotubes for Next-Generation Nanosensor Development *Nanomaterials: Computation, Theory, Machine Learning, and Experiment,* Telluride CO, Science & Innovation Center, June 15, 2025.
- **Piletsky S.S.** MIP-Based Epitope Mapping: 'Snapshot Imprinting', *MIP2024: The 12th International Conference on Molecular Imprinting,* Verona, Italy, 20 June 2024.
- **Piletsky, S.S.,** Heller D.A., Diagnostic QR Codes, *245th ECS Meeting,* San Francisco, CA, May 29, 2024.

PUBLICATIONS

1. Piletsky, S. A.; **Piletsky, S. S.** Molecularly Imprinted Polymers as Artificial Catalysts – Recent Trends and Emerging Applications. *TrAC Trends in Analytical Chemistry* **2025**, 193, 118435.
2. **Piletsky, S. S.;** Keblish, E. E.; Goffin, A. R.; Jin, X.; Zheng, M.; Kim, M.; Heller, D. A. Handle-Free Conjugation of Small Molecules Generates Tunable Emissive Defects on Carbon Nanotubes. *Nature Synthesis* (Under Revisions). Also available on ChemRxiv **2025**. https://doi.org/10.26434/CHEMRXIV-2025-5DXSD.
3. **Piletsky, S. S.;** Keblish, E. E.; Heller, D. A. Controlled Quantum Well Formation on DNA-Wrapped Carbon Nanotubes via Peroxide-Mediated Aryl Diazonium Reduction. *Nano Lett* **2025**, 25, 2480–2485.
4. Abdulsada, S. H.; Garcia Cruz, A.; Zaleski, C.; Piletska, E.; Ulker, D.; **Piletsky, S.;** Piletsky, S. A. Generic Strategy for the Synthesis of Highly Specific Au/MIP Nanozymes and Their Application in Homogeneous Assays. *Mater Adv* **2025**, 6 (1), 378–387.
5. **Piletsky, S. S.*;** Baidyuk, E.; Piletska, E. V.; Lezina, L.; Shevchenko, K.; Jones, D. J. L.; Cao, T. H.; Singh, R.; Spivey, A. C.; Aboagye, E. O.; Piletsky, S. A.; Barlev, N. A. Modulation of EGFR Activity by

Molecularly Imprinted Polymer Nanoparticles Targeting Intracellular Epitopes. *Nano Lett* **2023**, 23 (21), 9677–9682.

6. Kassem, S.; **Piletsky, S. S.*;** Yesilkaya, H.; Gazioglu, O.; Habtom, M.; Canfarotta, F.; Piletska, E.; Spivey, A. C.; Aboagye, E. O.; Piletsky, S. A. Assessing the In Vivo Biocompatibility of Molecularly Imprinted Polymer Nanoparticles. *Polymers (Basel)* **2022**, 14 (21), 4582.
7. **Piletsky, S. S.*;** Cruz, A. G.; Piletska, E.; Piletsky, S. A.; Aboagye, E. O.; Spivey, A. C. Iodo Silanes as Superior Substrates for the Solid Phase Synthesis of Molecularly Imprinted Polymer Nanoparticles. *Polymers (Basel)* **2022**, 14 (8), 1595.
8. Abbott, B.; Bedwell, T. S.; Grillo, F.; **Piletsky, S.;** Whitcombe, M. J.; Piletska, E.; Garcia-Cruz, A.; Cowen, T.; Piletsky, S. A. Use of Polymeric Solid Phase in Synthesis of MIP Nanoparticles for Biotin. *React Funct Polym* **2022**, 170, 105109.
9. **Piletsky, S. S.*;** Piletska, E.; Poblocka, M.; Macip, S.; Jones, D. J. L.; Braga, M.; Cao, T. H.; Singh, R.; Spivey, A. C.; Aboagye, E. O.; Piletsky, S. A. Snapshot Imprinting: Rapid Identification of Cancer Cell Surface Proteins and Epitopes Using Molecularly Imprinted Polymers. *Nano Today* **2021**, 41, 101304.
10. **Piletsky, S.;** Canfarotta, F.; Poma, A.; Bossi, A. M.; Piletsky, S. Molecularly Imprinted Polymers for Cell Recognition. *Trends Biotechnol* **2020**, 38 (4), 368–387.
11. Piletska, E. V.; Guerreiro, A.; Mersiyanova, M.; Cowen, T.; Canfarotta, F.; **Piletsky, S.;** Karim, K.; Piletsky, S. Probing Peptide Sequences on Their Ability to Generate Affinity Sites in Molecularly Imprinted Polymers. *Langmuir* **2020**, 36 (1), 279–283.
12. Piletska, E. V.; Mirkes, E.; **Piletsky, S. S.;** Abosoglu, H.; Cassim, A.; Chu, E.; Doughty, S.; Eganda, S. J.; Fuchigami, H.; Hussein, A.; Olickal, M.; Parmar, N.; Sebastian, A.; Piletsky, S. A. Combinatorial Screening of Polymer Nanoparticles for Their Ability to Recognize Epitopes of AAV-Neutralizing Antibodies. *Journal of Molecular Recognition* **2020**, 33 (4), e2824.
13. Piletska, E. V; Czulak, J.; **Piletsky, S. S.;** Guerreiro, A.; Canfarotta, F.; Piletsky, S. A. Novel Assay Format for Proteins Based on Magnetic Molecularly Imprinted Polymer Nanoparticles—Detection of Pepsin. *Journal of the Chinese Advanced Materials Society* **2018**, 6 (4), 341–351.
14. **Piletsky, S. S.*;** Cass, A. E. G.; Piletska, E. V.; Czulak, J.; Piletsky, S. A. A Novel Assay Format as an Alternative to ELISA: MINA Test for Biotin. *ChemNanoMat* **2018**, 4 (12), 1214–1222.
15. Piletska, E.; Yawer, H.; Canfarotta, F.; Moczko, E.; Smolinska-Kempisty, K.; **Piletsky, S. S.;** Guerreiro, A.; Whitcombe, M. J.; Piletsky, S. A. Biomimetic Silica Nanoparticles Prepared by a Combination of Solid-Phase Imprinting and Ostwald Ripening. *Scientific Reports* **2017** 7:1 2017, 7 (1), 1–9.
16. **Piletsky, S. S.*;** Rabinowicz, S.; Yang, Z.; Zagar, C.; Piletska, E. V; Guerreiro, A.; Piletsky, S. A. Development of Molecularly Imprinted Polymers Specific for Blood Antigens for Application in Antibody-Free Blood Typing. *Chemical Communications* **2017**, 53 (11), 1793–1796.
17. Piletska, E. V; **Piletsky, S. S.;** Guerreiro, A.; Karim, K.; Whitcombe, M. J.; Piletsky, S. A. Microplates with Enhanced Immobilization Capabilities Controlled by a Magnetic Field. *Journal of the Chinese Advanced Materials Society* **2014**, 2 (2), 118–129.
18. Piletska, E. V; **Piletsky, S. S.;** Whitcombe, M. J.; Chianella, I.; Piletsky, S. A. Development of a New Microtiter Plate Format for Clinically Relevant Assays. *Anal Chem* **2012**, 84 (4), 2038–2043.

PATENTS

- **Piletsky, S. S.**, Heller, D. A. Methods for covalently functionalizing semiconducting single walled carbon nanotubes and uses thereof. United States of America Patent Application No.: 63/718,439. Filed 2024.
- **Piletsky, S. S.**, Heller, D. A. Sensor array for fluorescence diagnostics. PCT application no.: PCT/US2024/039849, Filed 2024.
- Piletska, E. V., **Piletsky, S. S.**, Guerreiro, A., Karim, K., Whitcombe, M. J., & Piletsky, S. A.. Microplates with enhanced immobilization capabilities controlled by a magnetic field. Application no.: EP2856162B1. Filed 2013, granted 2018.