Padryk Elwyn Merkl

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Education

2017/10-2022/05: **PhD Medical Science, Karolinska Institutet**
Thesis Title: "Responsive Nanostructured Materials for Bioanalyte Detection and Triggered Antimicrobial Therapy" Defended: 20-05-2022
Advisor: Dr. Georgios A. Sotiriou

2012/09-2017/07: **Master of Chemical Physics, The University of Edinburgh**
2:1 Honours with Industrial Experience
Master's project: "An *Ab-initio* Study of Noble Gas Hydrates"
Supervisor: Prof. Andreas Hermann

Employment History

2023/12-Current: **Swedish research council international postdoctoral fellow, ETH Zürich**
Mucus degrading enzymes for pulmonary drug delivery and therapy

2023/06-2023/12: **Senior Material Scientist, AstraZeneca**
Working to ensure fast, effective and robust oral product development

2022/06-2023/05: **Postdoctoral Researcher, Karolinska Institutet**
Advisor: Dr. Georgios A. Sotiriou
Developing down-converting inorganic phosphorescent nanoparticles for in-vivo imaging and targeted delivery across the blood brain barrier

2015/07-2016/09: **Industrial placement, Unilever (Bedford, UK)**
Advisor: Dr. Paul Pudney
Confocal Raman spectroscopy to study hair protein secondary structure

Awards and Grants

2025	ETH Zürich Seed Grant
2023/12-2026/12	Swedish research council international postdoc grant
2023/09	PhD thesis award from the German Society for Aerosol Research (GAeF), Malaga, Spain
2022/11	Poster award Fall Materials Research Society Meeting 2022, Boston, U.S.A.
2022/09	Poster award International Aerosol Conference, Athens, Greece
2021/06	Poster award Scandinavian Society for Biomaterials Annual Meeting, Online
2019	Teaching award for "Disease and Illness DSM 2.1" at Karolinska Institutet

Publications

* indicates co-first authorship

1. Stability of Hydrogen Hydrates from Second-Order Møller–Plesset Perturbation Theory. Košata J., **Merkl P.**, Teeratchanan P. and Hermann A. (2018) The Journal of Physical Chemistry Letters, 9, p. 5624-5629
2. Luminescent $CeO_2 : Eu^{3+}$ nanocrystals for robust in situ H_2O_2 real-time detection in bacterial cell cultures. Henning, D. F., **Merkl, P.**, Yun, C., Iovino, F., Xie, L., Mouzourakis, E., Moularas, C., Deligiannakis, Y., Henriques-Normark, B., Leifer, K. and Sotiriou, G. A. (2019) Biosensors and Bioelectronics, 132, 286-293

3. Silica-coated phosphorescent nanoprobes for selective cell targeting and dynamic bioimaging of pathogen–host cell interactions. Iovino, F., **Merkl, P.**, Spyrogianni, A., Henriques-Normark, B. and Sotiriou, G. A. (2020) Chemical Communications, 56, 6989–6992.
4. Flame-Made Calcium Phosphate Nanoparticles with High Drug Loading for Delivery of Biologics. Tsikourkitoudi, V., Karlsson, J., **Merkl, P.**, Loh, E., Henriques-Normark, B. and Sotiriou, G. A. (2020) Molecules, 25, 1747.
5. Mannose receptor-derived peptides neutralize pore-forming toxins and reduce inflammation and development of pneumococcal disease. Subramanian, K., Iovino, F., Tsikourkitoudi, V., **Merkl, P.**, Ahmed, S., Berry, S. B., Aschtgen, M., Svensson, M., Bergman, P., Sotiriou, G. A. and Henriques-Normark, B. (2020) EMBO Molecular Medicine, 12.
6. Biofilm interfacial acidity evaluation by pH-Responsive luminescent nanoparticle films. **Merkl, P.**, Aschtgen, M.-S., Henriques-Normark, B. and Sotiriou, G. A. (2021) Biosensors and Bioelectronics, 171, 112732.
7. The Effect of the Molecular Weight of Polyvinylpyrrolidone and the Model Drug on Laser-Induced In Situ Amorphization. Hempel, N.-J., **Merkl, P.**, Knopp, M. M., Berthelsen, R., Teleki, A., Hansen, A. K., Sotiriou, G. A. and Löbmann, K. (2021) Molecules, 26, 4035.
8. Antiviral Activity of Silver, Copper Oxide and Zinc Oxide Nanoparticle Coatings against SARS-CoV-2. **Merkl, P.***, Long, S.*, McInerney, G. M. and Sotiriou, G. A. (2021) Nanomaterials, 11(5), 1312.
9. Utilizing Laser Activation of Photothermal Plasmonic Nanoparticles to Induce On-Demand Drug Amorphization Inside a Tablet. Hempel, N.-J., **Merkl, P.**, Asad, S., Knopp, M. M., Berthelsen, R., Bergström, C. A. S., Teleki, A., Sotiriou, G. A. and Löbmann, K. (2021) Molecular Pharmaceutics, 18, 2254–2262.
10. Plasmonic Coupling in Silver Nanoparticle Aggregates and Their Polymer Composite Films for Near-Infrared Photothermal Biofilm Eradication. **Merkl, P.**, Zhou, S., Zaganiaris, A., Shahata, M., Eleftheraki, A., Thersleff, T. and Sotiriou, G. A. (2021) ACS Applied Nano Materials, 4, 5330–5339.
11. The Influence of Drug–Polymer Solubility on Laser-Induced In Situ Drug Amorphization Using Photothermal Plasmonic Nanoparticles. Hempel, N.-J., **Merkl, P.**, Knopp, M. M., Berthelsen, R., Teleki, A., Sotiriou, G. A. and Löbmann, K. (2021) Pharmaceutics, 13(6), 917.
12. SERS Hotspot Engineering by Aerosol Self-Assembly of Plasmonic Ag Nanoaggregates with Tunable Interparticle Distance. Li, H., **Merkl, P.**, Sommertune, J., Thersleff, T. and Sotiriou, G. A. (2022) Advanced Science, 2201133
13. Highly durable photocatalytic titanium suboxide–polymer nanocomposite films with visible light-triggered antibiofilm activity. Bletsa, E., **Merkl, P.**, Thersleff, T., Normark S., Henriques-Normark B., Sotiriou, G.A. (2023) Chemical Engineering Journal, 454, 139971
14. STAT3 deficiency alters the macrophage activation pattern and enhances MMP9 expression during staphylococcal pneumonia Farmand S., Sender V., Karlsson J., **Merkl, P.**, Normark S., Henriques-Normark B. (2024) The Journal of Immunology, 212(1), 69-80
15. Customizable Fabrication of Photothermal Microneedles with Plasmonic Nanoparticles Using Low-Cost Stereolithography Three-Dimensional Printing Ziesmer J., Sondén I., **Merkl, P.**, Sotiriou, G.A. (2024) ACS Applied Bio Materials, 7, 4533–4541
16. Prevention of uropathogenic E. coli biofilm formation by hydrophobic nanoparticle coatings on polymeric substrates Dietl S.*, **Merkl, P.***, Sotiriou, G.A. (2024) RSC Applied Interfaces, 1, 667-670
17. Paper-based colorimetric hyperammonemia sensing by controlled oxidation of plasmonic silver nanoparticles **Merkl, P.**, Sotiriou, G.A. (2024) Nanoscale Advances, 6, 2586-2593