AISHWARYA MISHRA

Int. M.Sc, MRes, PhD, MRSC, Postdoctoral Researcher in Nanomedicine and Bioengineering

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A radiochemist aiming to build an independent research career and use radiochemistry and imaging as a tool to bring about unified approaches to human and ecosystem health

SUMMARY

- Interdisciplinary researcher with skills and experience in multimodal preclinical imaging using several modalities (SPECT, PET), synthetic chemistry, radiochemistry, nanomedicine, and brain drug delivery.
- Experience with RNA therapeutics and microfluidic organ on a chip model for cardiovascular applications
- Led collaborative and individual projects, which have led to the dissemination of results through conferences and research articles.
- Ability to effectively communicate detailed and complex information with a wide range of audiences, from academics to the public.
- Strong project management and organisational skills
- Passionate ambassador for public engagement/STEM outreach/volunteering. Wide range of teaching and curriculum development experiences within multiple departments

TECHNICAL SKILLS

- **Radiochemistry:** Radiation training, working with radionuclides to label different radioconjugates (Ga-68, Ga-67, Zr-89, I-123, Ra-223, Pb-203, Mn-52, Cu-64), radioTLC, radioHPLC
- **Microscopy/Imaging:** SPECT-CT (nanoSPECT/CT), PET-CT (nanoPET/CT), IVIS, Focused Ultrasound and respective acquisition software, Microscopy
- **Synthetic Chemistry:** Organic synthesis of small molecules and bioconjugates, Purification (HPLC, Dialysis, Chromatography)
- **Analytical chemistry** NMR (1H, 13C, 31P) and Mass spectroscopy (LC-MS, GC-MS, High-resolution mass spectroscopy), UV/Vis, fluorescence, DLS, NTA
- **Nanomedicine:** Synthesis using different formulations, microfluidics setup, Purification, Drug and Isotope loading, Drug delivery to the brain
- **Animal Handling:** PIL ABC, PPL amendment, mouse handling, intact brain harvest, perfusion, IV/IP/SC injections, preclinical brain models for drug delivery
- **Cell Biology:** Cell culture, Cell assays, In vitro serum assays, Cell radiolabeling, Cell therapies characterisation and handling experience for use in radiolabeling and in vivo tracking
- **Analysis software:** Vivoquant, Brain Atlas, Interview Fusion, Bruker Topspin, MestReNova, Mendeley, Graphpad, Mathematica, Chemdraw, HPLC and Mass spectra software

RESEARCH EXPERIENCE

National Heart and Lung Institute **Imperial College London**

Postdoctoral research in Nanomedicine and Bioengineering *December 2024- now*

- LNP research for delivery of miRNA to the cardiovascular tissue post-myocardial infraction
- Development of microfluidic heart on a chip model
- Imaging of targeted LNP delivery to the cardiac tissue

Department of Imaging Chemistry and Biology **King's College London**

Postdoctoral researcher in Cell tracking *August 2022 – October 2024*

- Postdoctoral research on cell and nanomedicine radiolabeling, tracking, and imaging in animal models with Zr-89, In-111, Ga-68, Pb-212, and Mn-52 in collaboration with academic and industry partners.[6,8]
- Coordinating and generating data for the MRC program grant and Total Body PET grant awarded to King's College London

CDT in Smart Medical Imaging **King's College London**

PhD student *Sept 2018 to December 2022*

- Led three collaborative projects focused on the imaging with Ga-68 and delivery of liposomal nanomedicines in animal models
- Responsible for designing experiments, developing new methods of *in vivo* radiolabeling and drug delivery to the brain[1,2,3,4,5,7,9]
- Conducting individual and collaborative research projects.

King's College London

Master of Research thesis *Sept 2017 to Sept 2018*

- A pretargeted PET imaging strategy for Nanomedicines[9]

University of British Columbia

Master's Thesis *May 2016 to December 2016*

- Development of an Alzheimer's Imaging agent under Dr. Urs Hafeli[10]

Research internships

- University of Queensland, Australia: Determination of brain metabolites using preclinical MRI[12]
- Tata Institute of Fundamental Research: Photochemical reactions in supramolecular confinement[11]

EDUCATION

- PhD: CDT in Smart Medical Imaging at King's College London /Imperial College London in Imaging Chemistry and Biology, 2018-2022 (under the supervision of Dr Rafael TM de Rosales (KCL) and Dr James Choi (ICL))
- MRes in Medical Imaging: King's College London, 2017-2018
- Dual BS/MS degree in Chemistry: University of Mumbai-DAE Centre for Excellence in Basic Science, 2012-2017

PROFESSIONAL TRAINING

- Leadership in Action course 2019 (Resilient Leaders Element @KCL)
- Nature Scientific Writing Masterclass 2021
- Advancing in Academia: Health Sciences @KCL 2020
- CDT Summer School for UK Medical Imaging CDTs 2019
- GTA - Preparing to Teach in Higher Education for GTAs @KCL 2020

TEACHING AND MENTORING EXPERIENCE

- Training new laboratory starters on animal procedures, image acquisition and analysis, radiation use
- Undergraduate Physical Chemistry Workshop Yr 1,2 and 3 2019-2021
- Mentoring Undergraduate Chemistry research laboratory projects 2018-2020
- Mentoring school students for Bronze Crest award 2019, 2020
- 2 X Master thesis supervision of students 2023-2024
- Co-supervision of PhD students 2022-2024

MAJOR PUBLIC ENGAGEMENT

- Great Exhibition Road Festival 2019, 2022, 2024
- I'm a scientist
- New Scientist Live 2021-2023
- Tales from the Lab 2021-2023

MEMBERSHIPS/POSITIONS HELD

- Member of ECR committee School of Biomedical Engineering and Imaging Sciences 2022-present
- Member of the Royal Society of Chemistry (RSC) 2018-present
- Board member of young UK European Society for Molecular Imaging (yUKESMI) 2019-2021
- Director, National Indian Students and Alumni Union (NISAU) 2022-present
- General Secretary, National Indian Students and Alumni Union (NISAU) 2019-present
- Young Scientist Committee member of Controlled Release Society (YSC-CRS) 2020-2022

AWARDS/GRANTS

- **WMIS Postdoctoral DEI Fellowship awardee 2024**
- King's Engaged Research Network's ECR Award 2023
- **PIEoneer Alumni of the Year Award 2023**
- CRS Young Scientist Travel Grant Award 2023
- King's College London Research Management Award 2022
- WMIC Student Travel Award 2021, 2024
- **RSC researcher development grant 2024, 2023, 2022, 2021**
- Centre for Doctoral Studies Conference Fund 2020
- ArtxResearch Public Engagement Grant 2020
- Mitacs Globalink Research Scholarship 2016

MAJOR CONFERENCE PRESENTATIONS

- **Invited Speaker** at **Division of Diagnostic Imaging, The University of Texas MD Anderson Cancer Center, Houston, TX, United States,** to deliver a session about my research work, 2024
- **Invited Speaker** at **European Molecular Imaging Society Meeting 2024** to deliver a study session titled: "Design of therapeutic and theranostic nanoparticles."
- **European Molecular Imaging Society Meeting 2020, 2022, 2024**
  Oral and poster presentations covering different projects on tracking nanomedicines to the brain, therapeutic cells, and cancer imaging.
- **Controlled Release Society Meeting 2020, 2021, 2023**
  Oral presentation: 2020 and 2021
  Panel moderator for a mentoring session involving leaders in the field of imaging and drug delivery.
  Awarded for best presentation in 2023.
  Poster session and abstract reviewer 2023, 2024

- **World Molecular Imaging Conference 2021, 2024**
  Presentation covering multiple topics, including nuclear imaging of liposomal nanomedicines, drug delivery and cell tracking
  Abstract reviewer 2024
  Highest scoring abstract submitted to the conference 2024

PUBLICATIONS

1. **Mishra, A.***, Morse, S. V.*, Chan, T. G., T. M. de Rosales, R., Choi, J. J., Liposome delivery to the brain with rapid short-pulses of focused ultrasound and microbubbles In: **Journal of controlled release** 341, p. 605-615 https://www.sciencedirect.com/science/article/pii/S0168365921006568
2. Firth, G., Blower, J., Bartnicka, J., **Mishra, A.**, ... Southworth, R., Blower, P.J., In vivo Imaging of Essential Trace Metals with Nuclear Medicine In: **RSC Chemical Biology** 3(5):495-518 https://pubs.rsc.org/en/content/articlehtml/2022/cb/d2cb00033d
3. Chang, W.L.K., Chan, T.G., Raguseo, F., **Mishra, A.**, Chattenton, D., T. M. de Rosales, R., Long, N.J., Morse, S.V., Rapid short-pulses of focused ultrasound and microbubbles deliver a range of agent sizes to the brain In: **Nature Scientific Reports** 2023; 13: 6963. https://www.nature.com/articles/s41598-023-33671-5
4. **Mishra, A.**, Carascal-Mininõ, A., Kim, J., T. M. de Rosales, R., [^{68}Ga]Ga-THP-Tetrazine for biorthogonal click radiolabelling: Pretargeted PET imaging of liposomal nanomedicines In: **RSC Chemical Biology** 2024,5, 622-639 https://pubs.rsc.org/en/content/articlehtml/2024/cb/d4cb00039k
5. **Mishra, A.**, Kim, J., Keeling, G., T.M. de Rosales, R., In vivo ^{68}Ga Radiolabelling of Liposomal Nanomedicines: Exploiting the Fast Complexation Kinetics and Selectivity of Tris(hydroxypyridinone) Ligands Towards Gallium(III) In: **ACS Omega** (accepted)
6. **Mishra, A.,** Payne, C., Pouliopoulos, A., T.M. de Rosales, R., Real-time monitoring of ^{89}Zr-Talidox delivery to the brain using FUS+MB mediated blood-brain barrier opening. In: **Nature Communications** (submitted)
7. **Mishra, A.,** …, T.M. de Rosales, R., Liposomal delivery to the murine brain using Focused Ultrasound and Microbubbles: Rapid Short Pulses (RaSP) Vs Conventional Long Pulses. **Proceedings of the World Molecular Imaging Congress** 2021, October 5-8, 2021 https://link.springer.com/article/10.1007/s11307-021-01693-y
8. **Mishra, A.,** Minino, A., Ruiz-Bedoya, C., Langdon, S., Blower. P.J., Davies, M., Maher, J., T.M. de Rosales, R., Tracking of 89Zr-Oxine-labeled CAR T-Cells with PET imaging: Solid Tumour Targeting and Therapeutic Efficacy in Head and Neck Cancer Model and the Impact of Tumour Irradiation. In: **Proceedings of the World Molecular Imaging Congress** 2024, September 9-13, 2024 https://www.xcdsystem.com/wmis/program/41mRX3V/index.cfm?pgid=2968&sid=28422&abid=110155
9. **Mishra, A.,** Choi, J., T. M. de Rosales, R., Exploring Pretargeted PET Imaging Strategies for Liposomal Nanomedicines. Published by King's College London https://kclpure.kcl.ac.uk/portal/files/195274527/2023_Mishra_Aishwarya_1783918_ethesis.pdf
10. **Mishra, A.,** Saatchi, K., Nosrati, Z., Hafeli, Urs., Development of an Alzheimer Imaging Agent based on Amyloid Beta interaction and metal chelation. Published by Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver (Master's thesis)**
11. **Mishra, A.,** Das, A., Dasgupta, Jyotishman., Photochemistry in confinement: Spectroscopic Characterization of a Host-Guest complex**.** Published by the University of Mumbai and Tata Institute of Fundamental Research**
12. **Mishra, A.,** Tesiram, Y., 2D spectroscopy of brain metabolites using MRI. Published by Centre for Advanced Imaging, University of Queensland, Brisbane**

*equally contributed to the work

** copies available on request