

EMINE KAZANC

EDUCATION AND QUALIFICATIONS

- **Higher Scientific Officer (HSO) in the Division of Cancer Biology, The Institute of Cancer Research, London, UK, 2021- 2025**

Team Leader: Associate Professor George Poulgiannis

Area: Signalling and Cancer Metabolism

Worked as part of the CRUK Grand Challenge – Rosetta Project, collaborating across seven research sites. Utilised multi-modal spatial omics (DESI, MALDI, IMC) and spatial transcriptomics, NanoString, to identify distinct metabolic subtypes (metabotypes) in breast tumours, revealing genetic signatures predictive of therapy response. Predictions were later tested on patient-derived organoids (PDOs), uncovering hidden vulnerabilities and advancing precision medicine in breast cancer.

- **Doctor of Philosophy (Ph.D.) in Division of System Medicine, Faculty of Medicine, 2017-2022
Imperial College of London, UK**

Supervisor: Professor Zoltan Takats

Ph.D. Thesis: MSI-Based Strategies for Mapping Tumour Heterogeneity

Developed a multimodal MSI-based approach to characterise tumour heterogeneity in clinical and PDX samples by integrating DESI-MS imaging, LC-MS, and RNA sequencing with laser capture microdissection (LCM). This strategy enabled the identification of metabolically distinct sub-regions and their genetic drivers, contributing to improved understanding, diagnosis, and therapy of tumours.

- **Master in Cancer Cell and Molecular Biology, August 2016
University of Leicester, Leicester, UK**

Supervisor: Professor Ed Louis

Master Thesis: Establishing a Yeast-Based System is for investigating human apoptotic regulators.

Developed a novel yeast system for screening apoptotic regulators and investigating possible apoptosis roles using yeast chromosome editing techniques.

- **Bachelor's in Molecular Biology and Genetics, June 2012
Istanbul University, Faculty of Arts and Science, Istanbul, Turkiye**

Final Year Thesis: A Review Study of Gene Therapy and Applications in Diseases

RESEARCH EXPERIENCE

- **Visitor Researcher (Feb–May 2015)**

Winship Cancer Institute, Emory University, USA (Prof. Erwin G. Van Meir's Lab)

Contributed to a cancer biology project focused on developing a novel cancer drug for Ewing Sarcoma and Uveal Melanoma.

- **TUBITAK Project Research Student (Jan 2013–Sept 2014)**

Nanobiotechnology Research Laboratory, Yeditepe University, Türkiye (Prof. Mustafa Culha's Lab)

Worked on a TUBITAK-funded project on Boron Nitride Nanotubes (BNNTs), exploring their synthesis, functionalization, and biomedical applications. Assessed BNNT toxicity in vitro and incorporated non-toxic BNNT-OHs into polymeric scaffolds to enhance biocompatibility and antimicrobial activity for tissue engineering.

• **Summer Intern (Aug–Sept 2011)**

Neuroscience Institute, Newcastle University, UK (Prof. Johannes Attems's Lab)

Gained in-depth knowledge of the mechanisms underlying age-associated neurodegenerative diseases.

KEY TECHNICAL SKILLS & EXPERTISE

Cell & Molecular Biology

- Cell Culture & Toxicity Assays (2D & 3D patient-derived organoids (PDOs))
- DNA/RNA Techniques: PCR, qRT-PCR, ddPCR, DNA/RNA isolation, quality assessments
- Protein Analysis: Western blot, SDS-PAGE
- Molecular Cloning & Genetic Engineering: Plasmid construction, bacterial transformation, primer design, agarose gel electrophoresis
- Microscopy: Confocal, Fluorescence
- Flow Cytometry (FACS)

Mass Spectrometry & Omics & Analytical Techniques

- DESI-Mass Spectrometry Imaging (DESI-MSI)
- Liquid Chromatography-Mass Spectrometry (LC-MS)
- Laser Capture Microdissection (LCM)
- Histopathology Techniques

Tissue Engineering & Material Science

- Freeze-drying & Electrospinning for scaffold preparation
- Zeta-Size (DLS) Analysis
- Spectroscopy & Imaging: Raman (SERS), UV/Vis, FT-IR

Bioinformatics Training (Sept–Dec 2016, Queen Mary University of London)

- **Genome Bioinformatics:** Unix, sequence alignment algorithms, bioinformatics databases
- **Coding for Scientists:** Python & R programming, statistical analysis
- **Post-Genomic Bioinformatics:** Transcriptomics, metabolomics, proteomics, proteogenomics, structural biology, target validation, systems biology, pathway analysis, GWAS (genome-wide association studies)

PUBLICATIONS

- Kaufmann M, Vaysse PM, Savage A, Kooreman LFS, Janssen N, Varma S, Ren KYM, Merchant S, Engel CJ, Olde Damink SWM, Smidt ML, Shousha S, Chauhan H, Karali E, **Kazanc E**, Poulgiannis G, et al. *Testing of rapid evaporative mass spectrometry for histological tissue classification and molecular diagnostics in a multisite study*. **British Journal of Cancer**, 2024.
- Dannhorn A, **Kazanc E**, Flint L, et al. *Morphological and molecular preservation through universal preparation of fresh-frozen tissue samples for multimodal imaging workflows*. **Nature Protocols**, 19, 2685–2711 (2024). <https://doi.org/10.1038/s41596-024-00987-z>
- Kreuzaler P, Inglese P, Ghanate A, Gjelaj E, Wu V, Panina Y, MacLachlan C, Patani N, Karali E, **Kazanc E**, et al. *Vitamin B5 supports MYC oncogenic metabolism and tumor progression in breast cancer*. **Nature Metabolism**, 5(11), 1870–1886 (2023). <https://doi.org/10.1038/s42255-023-00915-7>
- Dannhorn A, **Kazanc E**, Hamm G, Swales JG, Strittmatter N, Maglennon G, Goodwin RJA, Takats Z. *Correlating Mass Spectrometry Imaging and Liquid Chromatography-Tandem Mass Spectrometry for Tissue-Based Pharmacokinetic Studies*. **Metabolites**, 12(3), 261 (2022). <https://doi.org/10.3390/metabo12030261>
- Najumudeen AK, Ceteci F, Fey SK, Hamm G, Steven RT, Hall H, **Kazanc E**, et al. *The amino acid transporter SLC7A5 is required for efficient growth of KRAS-mutant colorectal cancer*. **Nature Genetics**, 53(1), 16–26 (2021). <https://doi.org/10.1038/s41588-020-00753-3>

- Dannhorn A, **Kazanc E**, Ling S, Nikula C, Karali E, Serra MP, Inglese P, Goodwin RJA, Takats Z, et al. *Universal sample preparation unlocking multimodal molecular tissue imaging*. **Analytical Chemistry**, 92(16), 11080–11088 (2020). <https://doi.org/10.1021/acs.analchem.0c00826>
- Emanet M, **Kazanc E**, Cobandede Z, Culha M. *Boron nitride nanotubes enhance properties of chitosan-based scaffolds*. **Carbohydrate Polymers**, 151, 313-320 (2016). <https://doi.org/10.1016/j.carbpol.2016.05.074> (Selected as a special manuscript for 10th NanoTR)
- Kalay S, Yilmaz Z, Sen O, Emanet M, **Kazanc E**, Culha M. *Synthesis of boron nitride nanotubes and their applications*. **Beilstein J Nanotechnology**, 6, 84-102 (2015). <https://doi.org/10.3762/bjnano.6.9> (Invited Review)

TEACHING EXPERIENCE

- **Imperial College London**
 - Undergraduate Practicals, Life Sciences & Medicine (Spring 2018–2021, 200+ hours)
 - Global Summer Schools (Summer 2018, 20 hours)
 - Master's Programs (Summer 2018, 20 hours)
- **Yeditepe University, Türkiye**
 - Biochemistry Laboratory (Fall 2013, 45 hours)
 - Analytical Chemistry Laboratory (Spring 2014, 45 hours)

SCHOLARSHIPS & HONORS

- **CRUK Cancer Grand Challenges Future Leaders Programme** – Represented the **Rosetta Team**
- **Full Scholarship for MSc & PhD Studies Abroad (2014–2020)**
Awarded by the **Ministry of National Education, Türkiye** to high-ranking students, covering tuition, health insurance, and living expenses.
- **TÜBİTAK Research Scholarship (2012–2014)**
- **Turkish Government Undergraduate Scholarship (2009–2012)**

CONFERENCES & PRESENTATIONS

- **Organoids: Advances and Applications (Sep 2024)**
Modelling organoids from 3D spatial multimodal cartography expands the scope of precision medicine in breast cancer – **Poster**
- **EMBO Workshop: The Spatial Biology of Cancer (Sep 2024)**
3D spatial cartography of the metabolome expands the scope for precision medicine in breast cancer – **Poster**
- **Oxford Global Spatial Biology UK (Mar 2024)**
3D spatial cartography of the metabolome expands the scope for precision medicine in breast cancer – **Talk**
- **EMBL-EBI Workshop: Cancer Genomics & Transcriptomics (2023)**
Metabolic snapshot: Unveiling ovarian cancer's heterogeneity with MSI-based single tissue section methodology – **Poster**
- **Abcam Cancer Metabolism Conference (2022)**
MSI-based single tissue section methodology to reveal metabolic heterogeneity in ovarian cancer – **Poster**
- **Metabolomics Virtual Conference (Oct 2020)**
Revealing metabolic heterogeneity in breast cancer using DESI-MS imaging with laser-microdissection coupled transcriptome approach – **Poster**
- **AACR Virtual Special Conference: Tumor Heterogeneity (Sep 2020)**
Multimodal analysis in breast cancer using DESI-MS imaging and laser-microdissection – **Video Poster**

- **Metabolomics Conference, The Hague, Netherlands (Jun 2019)**
Single tissue section analysis using DESI-MSI and laser capture microdissection for multimodal cancer research – Poster
- **67th ASMS Conference, Atlanta, USA (Jun 2019)**
A multimodal approach using DESI-MSI and laser capture microdissection for single tissue section analysis – Poster
- **MSACL US, Palm Springs, California (Mar–Apr 2019)**
Single tissue section analysis using DESI-MSI and laser capture microdissection – Talk (Young Investigator Grantee)
- **MSACL EU, Salzburg, Austria (Sep 2018)**
Evaluation of embedding methods for fragile clinical samples in MSI analysis – Poster (Young Investigator Grantee)
- **IMSC, Florence, Italy (Aug 2018)**
Evaluation of embedding methods for small, fragile samples in MSI analysis – Poster
- **NanoTR10 Nanoscience & Nanotechnology Conference, Yeditepe University, Türkiye (Jun 2014)**
Boron Nitride Nanotubes Enhance Properties of Chitosan-Based Scaffolds – Talk

SOCIETIES & PUBLIC ENGAGEMENT

- **Organizing Committee Member**, 12th ICR Technical Conference (Nov 2024)
- **Social Representative**, Chelsea Site, Higher Scientific Officer Society, ICR (2024–2025)
- **Public Engagement Volunteer**, Exhibition Road Festival, ICR (Jun 2023)
- **Public Engagement Volunteer**, Scientific Careers Event, ICR (Mar 2023)
- **Public Engagement Volunteer**, White City Festival, Imperial College London (May 2018)
- **Festival Community Volunteer**, Queen Mary University of London (May 2017)
- **GENIE Outreach & Public Engagement Volunteer**, University of Leicester (Jul 2016)
- **Organizing Committee Member**, NanoTR10 Conference, Yeditepe University (2013–2014)
- **Organizing Committee Member**, Genetic Club (IUGEN), Istanbul University (2009–2012)