

Nicole Strittmatter, PhD

Professor of Analytical Chemistry, Mass Spectrometry Expert

Email: nicole.strittmatter@tum.de, **Phone:** +49 (0)89 289 13321, **Homepage:** <https://www.bio.nat.tum.de/ach/>

ORCID iD: <https://orcid.org/0000-0003-1277-9608>

Linkedin: <https://www.linkedin.com/in/nicole-strittmatter-32228191/>

Trained analytical chemist and mass spectrometry professional with over 14 years of experience, 6 years of which were spent in pharmaceutical industry as mass spectrometry imaging expert. Main research focus on metabolomics, *in-situ* mass spectrometry, molecular imaging, and multimodal data integration.

Experience

10/2021 to present

Assistant Professor of Analytical Chemistry (Tenure Track)

Faculty of Chemistry, Technical University of Munich, Germany



- Development of *in situ* mass spectrometric methods for the characterization of complex biological samples such as tissue sections and microbial biofilms, especially using ambient mass spectrometry, imaging mass spectrometry, high resolution mass spectrometry, multimodal analysis, metabolomics
- Teaching: modules CH0107 Analytical Chemistry (BWL, BSc 3rd Semester, 2SWS), CH4109 Fundamentals of Analytical Chemistry – Trace analysis (Chemistry, BSc 3rd Semester, 2SWS), CH3125 Lab Rotation Analytical Chemistry 2, elective MSc module Advanced Mass Spectrometry, CH3123 Current Research in Instrumental Analysis of Trace Components 2 (Chemistry, MSc, 2SWS)

06/2019 to 08/2021

Associate Principal Scientist Mass Spectrometry Imaging

AstraZeneca, Cambridge, UK



- Additional responsibilities involve increased role in project prioritisation, establishing internal and external collaborations, initiating and participating in grant proposals
- Identification and implementation of independent and impactful science projects

04/2015 to 05/2019

Senior Scientist Mass Spectrometry Imaging

AstraZeneca, Cambridge, UK.



- MSI support for pre-clinical and clinical studies within global AZ R&D
- Role involves initial communication with project leaders, cryosectioning, method development and data acquisition, data analysis, report writing and communicating data back to the project
- Technologies used include DESI Imaging on Orbitrap platform, MALDI-TOF, imaging mass cytometry, H&E, immunofluorescence microscopy, DESI-TQS
- Lead for imaging of nanomedicine drug delivery, focus on oncology
- Participation in workstreams for multimodal data registration and integration and new methodologies in imaging drug nanocarriers
- Leading an internal science engagement forum (>1 year) and establishing a cross-functional imaging in drug delivery discussion group
- 6-month secondment in DMPK group performing drug metabolite identification, quantification and structure elucidation

11/2011 to 03/2012

Research Assistant

*Institute for Inorganic and Analytical Chemistry,
Justus-Liebig University Gießen*



- Characterisation of the direct coupling of thin-film microextraction and desorption electrospray ionisation mass spectrometry for the application to wastewater matrices
- Comparison with LC-MS and SPE/LC-MS; *in-situ* experiments.

Education

2012-2016

Doctor of Philosophy (received: 01.11.2016)

Department of Surgery and Cancer, Imperial College London



- Development of a rapid *in-situ* mass spectrometric profiling method for microorganisms and human cell lines based on Rapid Evaporative Ionisation Mass Spectrometry (REIMS)
- Generation and curation of spectral database, data analysis using multivariate statistical methods
- Culturing and handling of class 1 and 2 microbiological specimens (liquid and solid culture, aerobic and anaerobic), sterile working
- Identification of taxon-specific bacterial metabolites to identify microorganisms in human tissue and biofluid specimen
- DESI imaging of various murine and human tissue specimens with other PhD students and postdocs, researchers from other universities and pharmaceutical industry
- Managing and maintenance of DESI imaging capability and group's laboratory at Charing Cross Hospital

10/2009 to 09/2011

MSc in Chemistry

Justus-Liebig University Gießen, Germany



- Optional modules: Pollutants in the Environment, Chemistry of the Environment
- Advanced modules: Food Biotechnology, Analytical Methods in Life Sciences
- Specialisation Module: Proteomics and Toponomics
- Thesis on detection of pharmaceuticals and personal care products in wastewater treatment plant effluents using thin-film solid phase microextraction coupled to desorption electrospray ionization mass spectrometry (TFME-DESI-MS)

10/2006 to 10/2009

BSc in Chemistry

Justus-Liebig University Gießen, Germany



- Elective courses: Food Toxicology, Scientific Writing and Data Dissemination, Biotechnology of Sustainable Resources
- Thesis on characterisation of Special Inorganic Nanoscaled Dusts using differential scanning calorimetry, X-ray crystallography, thermogravimetric analysis and transmission electron microscopy.

Awards

2024	ERC Starting Grant
2023	Fachgruppenpreis Analytik of the Gesellschaft deutscher Chemiker (GdCH)
2015	MSACL Young investigator travel award
2014	MSACL Young investigator travel award

Additional Information

Reviewing and Editing	Ad-hoc reviewer for <i>Nature Scientific Reports</i>, <i>Rapid Communications in Mass Spectrometry</i>, <i>Clinical Applications</i>, <i>Journal of Mass Spectrometry & Advances in the Clinical Lab</i>, <i>Journal of Controlled Release</i>, <i>ChemBioChem</i>, <i>Nature</i>, <i>Analytical Chimica Acta</i>, <i>Analytical and Bioanalytical Chemistry</i>, <i>eBioMedicine</i>, <i>Analytical Chemistry</i>, <i>Translational Research</i>, <i>Journal of Agricultural and Food Chemistry</i>, <i>Food Science and Technology</i>, <i>Cancer & Metabolism</i>, <i>Nature Communications</i>, <i>Trends in Chemistry</i> Associate Editor Imaging, <i>Journal of Mass Spectrometry & Advances in the Clinical Lab</i> (Dec 2020-Jun 2024) Editorial Board Member <i>Metabolites</i> (since July 2022) Guest Editor <i>Metabolites</i> Special Issue “Applications of Mass Spectrometry in Metabolomics” Guest Editor “Spatial Biology” Collection for Wiley journals <i>Clinical and Translational Medicine</i>, <i>Journal of Cellular Physiology</i>, <i>Clinical and Translational Discovery</i>
Conference Organisation	Elected MSI study group co-chair, European Society for Molecular Imaging Co-organisation Munich Metabolomics Meeting, 13.10.2022, 12.-13.10.2023, 07.-08.10.2024, 08.-10.10.2025 Scientific Committee, 4th Poznan conference, “Modern pharmaceutical and biomedical analytics in health care”, Poland (23.-24.10.2023) Co-Chair Spatial Biology Sessions at Analytica 2024 (11.04.2024) Member Scientific Committee of the International Mass Spectrometry Meeting (IMSC) 2026 in Lyon, France
Other	Member of the commission for the GDCh Heyrovsky-Ilkovic-Nernst-Vorlesung (since January 23) Member of the commission for the GDCh Kaufmann-Hillenkamp Award for Mass Spectrometry-Based Explorations of Understudied Diseases (since April 2025) Member Prüfungsausschuss Chemie, School of Natural Sciences, TUM (since 2023)
Memberships	European Society for Molecular Imaging (ESMI) German Society for Mass Spectrometry (DGMS) Society for German Chemists (GDCh), Special Interest Group Analytical Chemistry German Metabolomics Society (DGMet) Mass Spectrometry Imaging Society (MSIS) Society for Biochemistry and Molecular Biology (GBM)

Full List of Publications

53 peer-reviewed publications since 2012, 10 first author publications, 5 last authored publications, >2100 citations, h-index: 27 (source Scopus, 27.03.2025)

Manuscripts

1. **Strittmatter N**, Duering RA, Takats Z, Analysis of wastewater samples by direct combination of thin-film microextraction and desorption electrospray ionization mass spectrometry. *Analyst* **2012**, 137(17), 4037-4044. DOI: 10.1039/C2AN35411J
2. **Strittmatter N**, Jones EA, Veselkov KA, Rebec M, Bundy JG, Takats Z. Analysis of intact bacteria using rapid evaporative ionisation mass spectrometry. *Chemical Communications* **2013**, 49(55):6188-90. DOI: 10.1039/c3cc42015a
3. **Strittmatter N**, Rebec M, Jones EA, Golf O, Abdolrasouli A, Balog J, Behrends V, Veselkov KA, Takats Z. Characterization and identification of clinically relevant microorganisms using rapid evaporative ionization mass spectrometry. *Analytical Chemistry* **2014**, 86(13): 6555-62. DOI: 10.1021/ac501075f
4. Swales JG, Tucker JW, **Strittmatter N**, Nilsson A, Cobice D, Clench MR, Mackay CL, Andren PE, Takáts Z, Webborn PJ. Mass spectrometry imaging of cassette-dosed drugs for higher throughput pharmacokinetic and biodistribution analysis. *Analytical Chemistry* **2014**, 86(16): 8473-80. DOI: 10.1021/ac502217r
5. Veselkov KA, Mirnezami R, **Strittmatter N**, Goldin RD, Kinross J, Speller AVM, Abramov T, Jones EA, Darzi A, Holmes E, Nicholson JK, Takats Z. Chemo-informatic strategy for imaging mass spectrometry-based hyperspectral profiling of lipid signatures in colorectal cancer. *Proceedings of the National Academy of Sciences of the United States of America* **2014**, 111(3): 1216-21. DOI: 10.1073/pnas.1310524111
6. Abbassi-Ghadi N, Veselkov KA, Kumar S, Huang J, Jones EA, **Strittmatter N**, Kudo H, Goldin RD, Takáts Z, Hanna GB. Discrimination of lymph node metastases using desorption electrospray ionisation-mass spectrometry imaging. *Chemical Communications* **2014**, 50(28): 3661-4. DOI: 10.1039/c3cc48927b
7. Liebeke M, **Strittmatter N**, Fearn S, Morgan AJ, Kille P, Fuchser J, Wallis D, Palchykov V, Robertson J, Lahive E, Spurgeon DJ, McPhail D, Takats Z, Bundy JG. Unique metabolites protect earthworms against plant polyphenols. *Nature Communications* **2015**, DOI: 10.1038/ncomms8869
8. Golf O, **Strittmatter N**, Karancsi T, Pringle SD, Speller AV, Mroz A, Kinross JM, Abbassi-Ghadi N, Jones EA, Takats Z. Rapid evaporative ionization mass spectrometry imaging platform for direct mapping from bulk tissue and bacterial growth media. *Analytical Chemistry* **2015**, 87(5): 2527-34. DOI: 10.1021/ac5046752
9. Abbassi-Ghadi N, Jones EA, Veselkov KA, Huang J, Kumar S, **Strittmatter N**, Golf O, Kudo H, Goldin RD, Hanna GB, Takats Z. Repeatability and reproducibility of desorption electrospray ionization-mass spectrometry (DESI-MS) for the imaging analysis of human cancer tissue: a gateway for clinical applications. *Analytical Methods* **2015**, 7: 71-80. DOI: 10.1039/C4AY01770F
10. Guenther S, Muirhead LJ, Speller AV, Golf O, **Strittmatter N**, Ramakrishnan R, Goldin RD, Jones EA, Veselkov K, Darzi A, Takats Z. Spatially resolved metabolic phenotyping of breast cancer by desorption electrospray ionization mass spectrometry. *Cancer Research* **2015**. DOI: 10.1158/0008-5472.CAN-14-2258
11. Oetjen J, Veselkov K, Watrous J, McKenzie JS, Becker M, Hauberg-Lotte L, Kobarg JH, **Strittmatter N**, Mróz AK, Hoffmann F, Trede D, Palmer A, Schiffler S, Steinhorst K, Aichler M, Goldin R, Guntinas-Lichius O, von Eggeling F, Thiele H, Maedler K, Walch A, Maass P, Dorrestein PC, Takats Z, Alexandrov T. Benchmark datasets for 3D MALDI- and DESI-imaging mass spectrometry. *GigaScience* **05/2015**. DOI: 10.1186/s13742-015-0059-4
12. Swales JG, **Strittmatter N**, Tucker JW, Clench MR, Webborn PJH, Goodwin RJA. Spatial Quantitation of Drugs in tissues using Liquid Extraction Surface Analysis Mass Spectrometry Imaging. *Scientific Reports* **2016**, 6, 37648. DOI: 10.1038/srep37648
13. Ashton S, Song YH, Nolan J, Cadogan E, Murray J, Odedra R, Foster J, Hall P, Low S, Taylor P, Ellston R, Polanska U, Wilson J, Howes C, Smith A, Goodwin RJA, Swales JG, **Strittmatter N**, Takáts Z, Nilsson A, Andren P, Trueman D, Walker M, Reimer CL, Troiano G, Parsons D, De Witt D, Ashford M, Hrkach J, Zale S, Jewsbury S, Barry ST. Aurora kinase inhibitor nanoparticles target tumors with favorable therapeutic index in vivo. *Science Translational Medicine* **2016**, 325(8), p325ra17. DOI: 10.1126/scitranslmed.aad2355
14. **Strittmatter N** and Lovrics A, Sessler J, McKenzie JS, Kucsma N, Szakacs G, Takats Z. Shotgun Lipidomic Characterization of the NCI60 Cell Line Panel Using Rapid Evaporative Ionization Mass Spectrometry. *Analytical Chemistry* **2016**, 88 (15), 7507–7514. DOI: 10.1021/acs.analchem.6b00187*
15. Shariatgorji M and **Strittmatter N**, Nilsson A, Källback P, Alvarsson A, Zhang X, Vallianatou T, Svenningsson P, Goodwin RJA, Andren PE. Simultaneous imaging of multiple neurotransmitters

and neuroactive substances in the brain by desorption electrospray ionization mass spectrometry. *NeuroImage* **2016**, 136, 129-138. DOI: 10.1016/j.neuroimage.2016.05.004*

16. Abbassi-Ghadi N, Golf O, Kumar S, Antonowicz SSA, McKenzie JS, Huang J, **Strittmatter N**, Kudo H, Jones EA, Veselkov KA, Goldin RD, Hanna GB, Takats Z. Imaging of Esophageal Lymph Node Metastases by Desorption Electrospray Ionization Mass Spectrometry. *Cancer Research* **2016**, 76(19), 5647-5656. DOI: 10.1158/0008-5472.CAN-16-0699
17. Dória ML, McKenzie JS, Mroz AK, Phelps DL, Speller AVM, Rosini F, **Strittmatter N**, Golf OH, Veselkov KA, Brown R, Ghaem-Maghamsi S, Takats Z. Epithelial ovarian carcinoma diagnosis by desorption electrospray ionization mass spectrometry imaging, *Scientific Reports* **2016**, 6, 39219. DOI: 10.1038/srep39219
18. England RM, Hare JI, Barnes J, Wilson J, Smith A, **Strittmatter N**, Kemmitt PD, Waring MJ, Barry ST, Alexander C, Ashford MB. Tumour regression and improved gastrointestinal tolerability from controlled release of SN-38 from novel polyoxazoline-modified dendrimers. *Journal of Controlled Release* **2017**, 247, 73–85. DOI: 10.1016/j.jconrel.2016.12.034
19. Hulme HE, Meikle LM, Wessel H, **Strittmatter N**, Swales J, Thomson C, Nilsson A, Nibbs RJB, Milling S, Andren PE, Mackay CL, Dexter A, Bunch J, Goodwin RJA, Burchmore R and Wall DM. Mass spectrometry imaging identifies palmitoylcarnitine as an immunological mediator during *Salmonella* Typhimurium infection. *Scientific Reports* **2017**, 7, 2786. DOI: 10.1038/s41598-017-03100-5
20. Galea D, Inglese P, Cammack L, **Strittmatter N**, Rebec M, Mirnezami R, Laponogov I, Kinross J, Nicholson JK, Takats Z & Veselkov KA. Translational utility of a hierarchical classification strategy in biomolecular data analytics. *Scientific Reports* **2017**, 7, 14981. DOI: 10.1038/s41598-017-14092-7
21. Swales JG, Dexter A, Hamm G, Nilsson A, **Strittmatter N**, Michopoulos F, Hardy C, Morentin-Gutierrez P, Mellor M, Andren PE, Clench MR, Bunch J, Critchlow SE, Goodwin RJA. Quantitation of endogenous metabolites in mouse tumors using mass-spectrometry imaging, *Analytical Chemistry* **2018**, 90(10), 6051-6058. DOI: 10.1021/acs.analchem.7b05239
22. Vallianatou T, **Strittmatter N**, Nilsson A, Shariatgorji M, Hamm G, Pereira M, Källback P, Svenningsson P, Karlgren M, Goodwin RJA, Andren P. A mass spectrometry imaging approach for investigating how drug-drug interactions influence drug blood-brain barrier permeability. *Neuroimage* **2018**, 172, 808-816. DOI: 10.1016/j.neuroimage.2018.01.013
23. Bäckström E, Hamm G, Nilsson A, Fihn BM, **Strittmatter N**, Andrén P, Goodwin RJA, Fridén M. Uncovering the regional localization of inhaled salmeterol retention in the lung, *Drug Delivery* **2018**, 25(1), 838-845. DOI: 10.1080/10717544.2018.1455762
24. Varshavi D, Scott FH, Varshavi D, Veeravalli S, Phillips IR, Veselkov K, **Strittmatter N**, Takats Z, Shephard EA, Everett JR. Metabolic biomarkers of ageing in C57BL/6J wild-type and flavin-containing monooxygenase 5 (FMO5)-knockout mice. *Frontiers in Molecular Biosciences* **2018**, 5, 28. DOI: 10.3389/fmolb.2018.00028
25. Inglese P, **Strittmatter N**, Doria ML, Mroz AK, Speller AVM, Poynter L, Dannhorn A, Kudo H, Mirnezami R, Goldin RD, Nicholson JK, Takats Z, Glen RC. Network analysis of mass spectrometry imaging data from colorectal cancer identifies key metabolites common to metastatic development. *bioRxiv* **2018**. DOI: <https://doi.org/10.1101/230052>
26. Davison AS and **Strittmatter N**, Sutherland H, Hughes AT, Hughes J, Bou-Gharios G, Milan AM, Goodwin RJA, Ranganath LR, Gallagher JA. Assessing the effect of nitisinone induced hypertyrosinaemia on monoamine neurotransmitters in brain tissue from a murine model of alkaptonuria using mass spectrometry imaging. *Metabolomics* **2019**, 15(5), 68. DOI: 10.1007/s11306-019-1531-4*
27. Hulme H, Meikle LM, **Strittmatter N**, van der Hooft JJJ, Swales J, Bragg RA, Villar VH, Ormsby M, Barnes S, Brown SL, Dexter A, Kamat MT, Komen JC, Walker D, Milling S, Osterweil E, MacDonald AS, Schofield CJ, Tardito S, Bunch J, Douce G, Edgar JM, Edrada-Ebel R, Goodwin RJA, Burchmore R, Wall DM. Microbiome-derived carnitine mimics as novel mediators of gut-brain axis communication. *Science Advances* **2020**, 6(11), eaax6328. DOI: 10.1126/sciadv.aax6328
28. Moss JI, Barjat H, Emmas SA, **Strittmatter N**, Maynard J, Goodwin RJA, Storm G, Lammers T, Puri S, Ashford MB, Barry ST. High-resolution 3D visualization of nanomedicine distribution in tumors. *Theranostics* **2020**, 10(2), 880-897. DOI: 10.7150/thno.37178
29. Hamm GR, Bäckström E, Brülls M, Nilsson A, **Strittmatter N**, Andrén PE, Grime K, Fridén M, Goodwin RJA. Revealing the Regional Localization and Differential Lung Retention of Inhaled Compounds by Mass Spectrometry Imaging. *Journal of Aerosol Medicine and Pulmonary Drug Delivery*, **2020**, 33(1), 43-53. DOI: 10.1089/jamp.2019.1536
30. Abbassi-Ghadi N, Antonowicz S, McKenzie J, Kumar S, Huang J, Jones E, **Strittmatter N**, Petts G, Kudo H, Court S, Hoare J, Veselkov K, Goldin R, Takats Z, Hanna G. De novo lipogenesis alters the

phospholipidome of esophageal adenocarcinoma. *Cancer Research* **2020**, 80(13), 2764-2774, DOI: 10.1158/0008-5472.CAN-19-4035

31. Dannhorn A, Kazanc E, Ling S, Nikula C, Karali E, Serra MP, Vorng JL, Inglese P, Maglennon G, Hamm G, Swales J, **Strittmatter N**, Poulogiannis G, Bunch J, Goodwin RJA, Takats Z. Universal sample preparation unlocking multimodal molecular tissue imaging, *Analytical Chemistry* **2020**, 92(16), 11080-11088, DOI: 10.1021/acs.analchem.0c00826
32. Shariatgorji R, Nilsson A, **Strittmatter N**, Vallianatou T, Zhang X, Svenningsson P, Goodwin R, Andrén PE. Bromopyrylium derivatization facilitates identification by mass spectrometry imaging of monoamine neurotransmitters and small molecule neuroactive compounds. *Journal of the American Society of Mass Spectrometry* **2020**, 31(12), 2553-2557, DOI: 10.1021/jasms.0c00166
33. Ormsby MJ, Hulme H, Villar VH, Hamm G, Rodriguez-Blanco G, Bragg RA, **Strittmatter N**, Schofield CJ, Delles C, Salt IP, Tardito S, Burchmore R, Goodwin RJA, Wall DM. Microbiome-derived metabolites reproduce the mitochondrial dysfunction and decreased insulin sensitivity observed in type 2 diabetes, *bioRxiv* **2020**, DOI: 10.1101/2020.08.02.232447
34. Colclough N, Chen K, Johnstöm P, **Strittmatter N**, Yan Y, Wrigley GL, Schou M, Goodwin R, Varnäs K, Adua S, Zhao M, Nguyen DX, Maglennon G, Barton P, Atkinson J, Han L, Zhang D, Zhang Z, Janefeldt A, Wilson J, Smith A, Takano A, Arakawa R, Kondrashov M, Malmquist J, Revunov E, Vazquez-Romero A, Mahdi Moein M, Windhorst AD, Karp NA, Finlay MRV, Ward R, Yates JWT, Smith P, Farde L, Cross DAE. Preclinical comparison of the blood brain barrier (BBB) permeability of osimertinib with other EGFR TKIs. *Clinical Cancer Research* **2021**, 27(1), 189-201. DOI: 10.1158/1078-0432.CCR-19-1871
35. Dannhorn A, Ling S, Powell S, McCall E, Maglennon G, Jones G, Pierce A, **Strittmatter N**, Hamm G, Barry S, Bunch J, Goodwin R, Takats Z. Evaluation of UV-C decontamination of clinical tissue sections for spatially resolved analysis by mass spectrometry imaging (MSI). *Analytical Chemistry* **2021**, 93(5), 2767-2775. DOI: 10.1021/acs.analchem.0c03430
36. Race AM, Sutton D, Hamm G, Maglennon G, Morton JP, **Strittmatter N**, Campbell A, CRUK Grand Challenge Rosetta Consortium, Sansom OJ, Wang Y, Barry ST, Bunch J, Goodwin RJA. Deep learning-based annotation transfer between molecular imaging modalities: A route to multi-modal data integration. *Analytical Chemistry* **2021**, 93(6), 3061-3071. DOI: 10.1021/acs.analchem.0c02726
37. **Strittmatter N**, England R, Moss J, Race AM, Sutton D, Maglennon G, Ling S, Wong E, Rose J, McDonald R, Jones S, Ashford M, Goodwin RJA. Method to investigate the distribution of water-soluble compounds in fresh frozen tissues using imaging mass cytometry, *Analytical Chemistry* **2021**, 93, 8, 3742-3749. DOI: 10.1021/acs.analchem.0c03908[†]
38. Shariatgorji R, Nilsson A, Fridjonsdottir E, **Strittmatter N**, Dannhorn A, Svenningsson P, Goodwin RJA, Odell L, Andrén PE. Spatial visualization of comprehensive brain neurotransmitter systems and neuroactive substances by selective in situ chemical derivatization mass spectrometry imaging. *Nature Protocols* **2021**, 16, 3298-3321. DOI: 10.1038/s41596-021-00538-w
39. **Strittmatter N** and Kanvatirth P, Inglese P, Race AM, Nilsson A, Dannhorn A, Ling S, Wong E, Seeliger F, Serra MP, Hoffmann S, Maglennon G, Atkinson J, Jones S, Hamm G, Bunch J, Andren P, Takats Z, Goodwin R, Mastroeni P. Studying the effects of *Salmonella* typhimurium infection and ciprofloxacin treatment using mass spectrometry imaging, *Journal of the American Society of Mass Spectrometry* **2021**, 32, 12, 2791-2802. DOI: 10.1021/jasms.1c00240 ^{*,†}
40. Hulme H, Meikle LM, **Strittmatter N**, Swales J, Hamm G, Brown SL, Milling S, MacDonald AS, Goodwin RJA, Burchmore B, Wall D. Mapping the Influence of the Gut Microbiota on Small Molecules across the Microbiome Gut Brain Axis. *Journal of the American Society of Mass Spectrometry* **2022**, 33(4), 649-659. DOI: 10.1021/jasms.1c00298
41. Dannhorn A, Kazanc E, Hamm G, Swales J, **Strittmatter N**, Maglennon G, Goodwin RJA, Takats Z. Correlating mass spectrometry imaging and liquid chromatography-tandem mass spectrometry for tissue-based pharmacokinetic studies. *Metabolites* **2022**, 12(3), 261. DOI: 10.3390/metabo12030261
42. **Strittmatter N** and Richards FM, Race AM, Ling S, Sutton D, Nilsson A, Wallez Y, Barnes J, Maglennon G, Gopinathan A, Brais R, Wong E, Serra MP, Atkinson J, Smith A, Wilson J, Hamm G, Johnson TI, Dunlop CR, Kaistha BP, Andren PE, Lau A, Barry ST, Jodrell DI, Goodwin RJA. Method To Visualize the Intratumor Distribution and Impact of Gemcitabine in Pancreatic Ductal Adenocarcinoma by Multimodal Imaging, *Analytical Chemistry* **2022**, 94(3), 1795-1803. DOI: 10.1021/acs.analchem.1c04579 ^{*,†}
43. **Strittmatter N**, Moss JI, Race AM, Sutton D, Rodriguez Canales J, Ling S, Wong E, Wilson J, Smith A, Howes C, Bunch J, Barry ST, Goodwin RJA, Ashford MB. Multi-modal molecular imaging maps the

- correlation between tumor microenvironments and nanomedicine distribution, *Theranostics* **2022**, 12(5):2162-2174. DOI:10.7150/thno.68000
44. Illes-Toth E, Hale OJ, Hughes JW, **Strittmatter N**, Rose J, Clayton B, Sargeant R, Jones S, Dannhorn A, Goodwin RJA, Cooper HJ. In situ detection and imaging of a non-covalent protein-drug complex in tissue from orally-dosed rats. *Angewandte Chemie Int. Ed.* **2022**, 61(36), e202202075. DOI: 10.1002/anie.202202075
 45. Adua AJ, Arnal-Estape A, Zhao M, Qi B, Liu ZZ, Kravitz C, Hulme H, **Strittmatter N**, Lopez-Giraldez F, Albert AE, Melnick M, Politi K, Chiang V, Colclough N, Goodwin RJA, Smith P, Cross D, Nguyen DX. Brain Metastatic Outgrowth and Osimertinib Resistance are linked via RhoA in EGFR mutant Lung Cancer, *Nature Communications* **2022**, 13 (1), 7690. DOI: 10.1038/s41467-022-34889-z
 46. Dannhorn A, Swales JG, Hamm G, **Strittmatter N**, Kudo H, Maglennon G, Goodwin RJA, Takats Z. Evaluation of formalin-fixed and FFPE tissues for spatially resolved metabolomics and drug distribution studies. *Pharmaceuticals* **2022**, 15(11). 1307. DOI: 10.3390/ph15111307
 47. Dannhorn A, Doria ML, McKenzie J, Inglese P, Swales JG, Hamm G, **Strittmatter N**, Maglennon G, Ghaem-Maghami S, Goodwin RJA, Takats Z. Targeted desorption electrospray ionization mass spectrometry imaging for drug distribution, toxicity and tissue classification studies. *Metabolites* **2023**, 13(3), 377, DOI: 10.3390/metabo13030377.
 48. Heffernan D and Pilz M, Klein M, Race AM, Brück T, Quora F, **Strittmatter N**. Screening of volatile organic compounds (VOCs) from liquid fungi cultures using ambient mass spectrometry. *Analytical and Bioanalytical Chemistry* **2023**, 415(18), 4615-4627, DOI: 10.1007/s00216-023-04769-6[†]
 49. Grashei M, Wodtke P, Skinner JG, Sühnel S, Setzer N, Metzler T, Gulde S, Park M, Mohr H, Hundshammer C, **Strittmatter N**, Pellegata N, Steiger K, Schilling F. Simultaneous Magnetic Resonance Imaging of pH, Perfusion and Renal Filtration using Hyperpolarized ¹³C-labelled Z-OMPD. *Nature Communications* **2023**, 14(1), 5060. DOI: 10.1038/s41467-023-40747-3.
 50. Park M., Casini A, **Strittmatter N**, Seeing the invisible: Preparative strategies to visualise elusive molecules using mass spectrometry imaging. *Trends in Analytical Chemistry* **2023**, 168, 117304. DOI: 10.1016/j.trac.2023.117304[†]
 51. Rodríguez-Prieto T, Wragg D, Heiduk N, Park M, **Strittmatter N**, Fischer RA, Casini A, Moreno-Alcántar G. A Golden Touch in the Design of Multifunctional Porphyrin Metallacages: Host–Guest Chemistry for Drug-Target Interactions. *CCS Chemistry* **2024**, 6(7), 1662-1671. DOI: 10.31635/ccschem.024.202404056
 52. Chen W, Qiu M, Paizs P, Sadwoski M, Ramonaite T, Zborovsky L, Mejias-Luque R, Janßen KP, Kinross J, Goldin RD, Rebec M, Liebeke M, Takats Z, McKenzie JS, **Strittmatter N**. Universal, untargeted detection of bacteria in tissues using metabolomics workflows, *Nature Communications* **2025**, 16, 165. DOI: 10.1038/s41467-024-55457-7[†]
 53. Meindl A, Heffernan D, Kudermann J, **Strittmatter N**, Senge MO. Direct CO₂ Activation and Conversion to Ethanol via Reactive Oxygen Species, *Angewandte Chemie International Edition* **2025** (in print). DOI: 10.1002/anie.202422967
 54. Heffernan D, Oleinek F, Schueler A, Lau PW, Kudermann J, Meindl A, Senge MO, **Strittmatter N**. Headspace injection method for intermittent sampling and profiling analyses of volatile organic compounds using Dielectric Barrier Discharge Ionization (DBDI). *Journal of the American Society for Mass Spectrometry* **2025**, 36, 801-810. DOI: 10.1021/jasms.4c00475[†]
 55. Weider P, Heffernan D, Qiu M, Klein M, Witthöft C, Chen W, **Strittmatter N**. Commercially Available Blue Diode Laser Engraver Operating at 455 nm as an Affordable LD-REIMS Ionization Source. *Analytical Chemistry* **2005** (in print). DOI: 10.1021/acs.analchem.5c00724[†]
 56. Kurzweil L, Stark TD, Hille K, Hoheneder F, Mrtva J, Hausladen H, Lenk M; Motawia MS, **Strittmatter N**, Vlot C; Pillen K; Sørensen M; Møller B; Hückelhoven R, Dawid C. Characterization of metabolome alterations in barley (*Hordeum vulgare* L.) leaves induced by *Bipolaris sorokiniana*. *Food Chemistry (preprint available)*

* Shared first authorship, † corresponding authorship

Others:

- Invited Book Review for *Analytical and Bioanalytical Chemistry* on Tiffany Porta Siegel (Ed.): MALDI mass spectrometry imaging: from fundamentals to spatial omics. DOI: 10.1007/s00216-022-04127-y (2022)

Book Chapters

- Takats Z, **Strittmatter N**, McKenzie JS. Advances in Cancer Research Volume 134, Applications of Mass Spectrometry Imaging to Cancer. Chapter 9: Ambient Mass Spectrometry in Cancer Research. *Elsevier* **2015**. Edited by Drake RR and McDonnell LA. ISBN: 9780128052495
- **N. Strittmatter**, Detection and Analysis of Microorganisms by Mass Spectrometry: Chapter 4: Ambient Ionization Mass Spectrometry for Microbial Analysis, *RSC* **2023**, Edited by: Liang Qiao, Jia Yi, DOI: 10.1039/9781837670338

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Period	Source	Amount	Project name	Co-applicants
01.01.2022-31.12.2022	TUM Global Incentive Fund	9,200 €	High-throughput multi-omics characterisation of single bacterial cells residing in biofilms	Prof. Zoltan Takats, ICL
01.06.2021-31.11.2023	TUM ERC Seed Fund	50,000 €	New Systems-Microbiology strategies for the analysis and engineering of biofilms using MSI	n/a
01.10.2022-31.04.2024	Merck Biopharma Speed Grant	30,000 €	Methods to enable holistic characterisation of the microbiota-host-irinotecan axis	
01.09.2023-31.08.2027	DFG Forschungsgruppe (FOR5560)	330,742 € for NSt	Wechselwirkungen zwischen dem Stoffwechsel und der Signalübertragung in B-Zellen“ - TP: „Der MALT1-Signalweg in BZell Metabolismus und Funktion“	Prof. Dr. Jürgen Ruland
01.07.2023-15.10.2023	BZKF - Translationsgruppen	12.500 € of overall 50.000 €	Seed funding for preparation of second stage proposal on „IT-gestützte Analyse der metabolischen, transkriptomischen und immunologischen Architektur in der Tumormikroumgebung von 3D-Organoiden aus Kopf-Hals-Karzinomen“	Prof. Dr. Barbara Wollenberg, Prof Dr. Daniel Rückert, PD Dr Fabian Stögbauer
30.08.2024-31.-07.2025	Bavaria-Queensland Research Alliance Seed Fund (StMWK)	10,000 €	Metabolic insights of new biofilm treatments using mass spectrometry	Prof. Kathryn Fairfull-Smith
01.12.2024-30.11.2029	ERC Starting grant 2024	2,48m €	Capturing tumoral drug metabolism by Cells In the Tissue Environment using spatial pharmacometabolomics CITE (101163588)	
01.03.2025-28.02.2027	DFG SPP2322 SoilSystems	139,111 € for NSt	Lokalisierung von Hotspots mikrobieller Metabolite zur Aufklärung der Dynamik von Energie und organischem Kohlenstoff im Boden (SoilEnergySpots)	Dr. Steffen Schweizer, Prof. Mirjana Minceva

2025-2028	DFG – SPP2494 Productive Biofilms	205.660 € for NSt	Harnessing spatial metabolomic pattern to exploit cyanobacteria of the genus Nostoc as productive biofilms	Prof. Elke Dittmann, Potsdam University
2025-2030	MSCA Doctoral Network SpaXio	387.029 € for NSt	Spatial Cross-Talk in Immuno- Oncology Involvement of metabolites in cancer progression and metastasis formation	Speaker: Peter Krenn, Dirk Arras-Schmidt (U Salzburg)