

Dominik John

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Profile

Recent PhD graduate with four first-author papers introducing new imaging methods in X-ray phase-contrast imaging, three of which were published in high-impact journals. Conceived and led two synchrotron beamtimes as PI and carried out a six-month research stay in Australia, resulting in a first-author publication featured on the cover of *Advanced Science* and in major German press.

Beyond research, his profile spans competitive doctoral funding, participation in a highly selective full-time leadership academy, entrepreneurial experience as co-founder of a software company and through the TUM startup incubator, and two national first prizes for science communication.

Education

PhD in Physics (Dr. rer. nat.)

Jan 2023 – Aug 2026

Technical University of Munich (TUM), Germany · Grade: summa cum laude

- Dissertation: *Quantitative Modulation-based X-ray Microtomography*, successfully defended on 18 Aug 2026; Supervisor: Prof. Dr. Julia Herzen
- Research conducted in collaboration with Helmholtz-Zentrum Hereon (imaging beamlines P05/P07 at PETRA III, DESY); included a 6-month research stay at Monash University, Australia
- Key results:
 - Developed the first method to obtain tissue-specific, clinician-readable histology slices from 3D X-ray data, enabling cancer research in full 3D context (featured on the cover of *Advanced Science* and in German press)
 - Developed a multimodal X-ray imaging setup with the highest imaging efficiency reported to date, enabling highly dose-efficient measurements on biological tissues (*Optica*)
 - Developed a method to image centimeter-sized samples at micrometer resolution, highly relevant for 3D organoid and cancer research (*IEEE Trans. Image Processing*)

M.Sc. Biomedical Engineering and Medical Physics

Oct 2020 – Oct 2022

Technical University of Munich, Germany · Graduated with distinction: 1.1 (rank 1 of 82 students; German scale: 1.0 best, 5.0 fail)

- Thesis: *Dynamic X-ray Dark-field Tomography for Cryoablation Monitoring* (grade 1.0) – first demonstration of dark-field CT for monitoring tissue freezing, highly relevant to the minimally invasive tumor treatment of cryoablation (*Scientific Reports*)
- Study focus area: Imaging techniques (CT, MRI)

B.Sc. Physics

Oct 2017 – Sep 2020

Technical University of Munich, Germany · Final grade: 1.7 (best 10%)

- Thesis on the comparison of different computed tomography reconstruction algorithms in terms of achieved image quality (grade 1.0)

A-Levels (Abitur)

Sep 2009 – Jun 2017

Albert-Einstein-Gymnasium Munich, Germany · Grade 1.0 (best: 1.0), rank 1 of 148

- Awarded the Abitur prize of the German Physical Society (DPG) for exceptional achievements in the field of physics

Professional Experience

Freelance Consultant, Science Communication

Jan 2025 – Present

Munich, Germany · Consulting, web development & video production

- Advise research groups and institutions on science-communication strategy; design and develop websites and produce short-form video content for clients
- Apply skills developed through award-winning science-communication work (see Prizes & Awards) to independent client projects

UnternehmerTUM Startup Incubator, Batch 1/2026**Mar 2026 – Jun 2026**

Munich, Germany · Project: *Histonaut* – commercializing virtual histology using high-resolution multimodal X-ray imaging

- Ten-week program at Europe's largest entrepreneurship center: 70+ hours of workshops and coaching covering IP evaluation, market analysis and beachhead-market definition, customer discovery interviews, value-proposition design, and pitching to an expert jury

Research Associate**Apr 2023 – Mar 2026**

Helmholtz-Zentrum Hereon, Hamburg, Germany

- Doctoral research position (see PhD entry); developed the image processing pipelines now underlying the imaging beamlines P05 and P07 at PETRA III (DESY) – now the standard reconstruction method for modulation-based experiments at both beamlines (used by 15+ external user groups so far)

Co-Founder & Managing Director**Aug 2020 – Dec 2025**

Polyidea UG, Munich, Germany

- Founded and ran a software company alongside studies, delivering 30+ client projects for small and medium-sized enterprises: custom business software, interactive web applications, and scientific-communication websites
- Held full budget and personnel responsibility, recruiting three working students and three external freelancers; managed projects from client acquisition to final delivery

Visiting Researcher**Nov 2024 – Apr 2025**

Monash University, Melbourne, Australia

- Six-month stay including a self-proposed synchrotron beamtime experiment at the Australian Synchrotron (MCT)
- Developed an algorithm enabling, for the first time, quantitative, high-resolution virtual histology of stained tissues

Prizes & Awards

Young Scientist Award (1st place) & Best Video Debut (1st place)**Sep 2025**

Fast Forward Science 2025, Wissenschaft im Dialog / Stifterverband, Germany

- Won first prizes in two categories in Germany's largest science-communication competition for a video on turning X-ray images from black-and-white to "colorful" to improve diagnoses

D-BOP Award**Oct 2023**

Federal Ministry of Education and Research (BMBF), Germany

- Won €5,000 in a nation-wide competition of the German education ministry for developing an app that helps students build future-skills competencies and orient their career path

Scholarships

Doctoral Scholarship**Apr 2023 – Aug 2026**

Friedrich Naumann Foundation, Germany

- Competitive selection by one of Germany's 13 national talent-support foundations, funded by the Federal Ministry of Education and Research; value: €124,000, awarded on academic record and civic engagement
- Included a program of seminars in leadership, science communication, and entrepreneurship, and a two-week international academy in Morocco on North African economic and political development

Bavarian EliteAcademy (Bayerische EliteAkademie), 22nd cohort**Sep 2020 – Sep 2023**

Foundation of the Bavarian industry (founded by Allianz, BMW, Siemens, Munich Re, E.ON)

- 40 selected of 1,400 applicants (3% acceptance rate) from all Bavarian universities, selected in a three-stage assessment center
- Extra-occupational leadership programme comprising 12 weeks of full-time residential training across four phases: interdisciplinary team projects, seminars in leadership, negotiation, conflict management, entrepreneurship and communication
- Mentoring by a senior executive from Bavarian industry (Dr. Horst Kayser, CSO of Siemens)

- Value: €18,000, awarded on academic record and civic engagement; included a program of seminars in leadership & rhetoric

Skills & Languages

Programming & Computing: Python (scientific stack: NumPy, SciPy, scikit-image), C, Git, GitHub, SLURM (HPC clusters)

Research Infrastructure: Extensive large-scale facility experience – 20+ synchrotron beamtimes at PETRA III (P05, P07, P10, DESY) and the Australian Synchrotron (MCT and IMBL beamlines); large-scale scientific data processing and pipeline development

Languages: German (native), English (fluent), French (conversational)

First-Author Publications (Peer-reviewed)

Extending the Field of View in Modulation-Based X-Ray Phase Microtomography **Mar 2026**

D. John*, J. Chen*, C. Gaßner, S. Savatović, L. M. Petzold, S. Wirtensohn, M. Riedel, J. U. Hammel, J. Moosmann, F. Beckmann, M. Wiczorek, J. Herzen (*shared-first authorship)

IEEE Transactions on Image Processing, Vol. 35, pp. 3411–3420 (2026)

- Significance: First image-processing approach producing quantitative 3D electron density maps of centimeter-sized objects at micrometer resolution, robust to motion and instabilities in the X-ray source

Near-perfect Efficiency in X-ray Phase Microtomography **Feb 2026**

D. John, G. Breitenhuber, S. Wirtensohn, F. Hinterdobler, L. Gaetani, S. Savatović, J. Lucht, M. Osterhoff, M. Eckermann, T. Salditt, J. Herzen

Optica, Vol. 13, pp. 273–283 (2026)

- Significance: First imaging setup reaching efficiency close to the theoretical limit of 100% for single-mask X-ray phase microtomography, enabling dose-efficient investigations of biological samples

Quantitative Stain Mapping in X-Ray Virtual Histology **Jan 2026**

D. John, D. M. Paganin, M.-C. Zdora, L. M. Petzold, P. Ilg, J. Chen, S. Baggio, J. B. Thalhammer, S. Wirtensohn, J. Moosmann, J. U. Hammel, F. Beckmann, S. J. Alloo, J. N. Ahlers, M. Busse, J. Herzen, K. S. Morgan

Advanced Science, Vol. 13, no. 21, e19783 (2026)

- Significance: First method to quantify the presence of X-ray stains at histologically relevant scales in 3D, enabling disease research in three dimensions

X-ray Dark-field Computed Tomography for Monitoring of Tissue Freezing **Mar 2024**

D. John, W. Gottwald, D. Berthe, S. Wirtensohn, J. Hickler, L. Heck, J. Herzen

Scientific Reports, Vol. 14, Art. 5599 (2024)

- Significance: First demonstration of monitoring tissue freezing using time-resolved 3D X-ray dark-field imaging, highly relevant to the cancer treatment of cryoablation

Conference Proceedings

Recent Developments in Quantitative Phase-Contrast Microtomography using Talbot **Oct 2024**

Array Illuminators

D. John, M. Riedel, A. Gustschin, S. Savatović, A. Breit, F. De Marco, P. Bidola, J. U. Hammel, J. Moosmann, D. C. F. Wieland, B. Zeller-Plumhoff, F. Beckmann, J. Herzen

Developments in X-ray Tomography XV, Proc. SPIE 13152, 109–116 (2024)

- Significance: Introduced a new experimental setup that improves the quantitative accuracy of the phase signal

Co-authored Publications (Peer-reviewed)

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- Directional Dark Field for Nanoscale Full-field Transmission X-ray Microscopy** **May 2026**
S. Wirtensohn, S. Flenner, **D. John**, P. Qi, C. David, M. May, P. Huber, D. Herzog, S. Tangl, C. Kampleitner, K. Singh, I. Kelbassa, K. Bekes, J. Herzen, I. Greving
Light: Science & Applications, Vol. 15, no. 1, Art. 223 (2026)
- Grating-based X-ray Dark-field Mammography: Assessing Complementary Imaging Information in Simple Cystic Lesions and Typical Fibroadenoma** **Jan 2025**
K. Hellerhoff, W. Gottwald, K. Taphorn, D. Berthe, M. Braun, K. Wagner, S. Resch, **D. John**, L. Heck, L. Birnbacher, J. Herzen, S. Grandl
Medical Physics, Vol. 52, pp. 2145–2154 (2025)
- Self-supervised Denoising of Grating-based Phase-Contrast Computed Tomography** **Dec 2024**
S. Wirtensohn, C. Schmid, D. Berthe, **D. John**, L. Heck, K. Taphorn, S. Flenner, J. Herzen
Scientific Reports, Vol. 14, no. 1, Art. 32169 (2024)

Oral Presentations

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- Tissue-specific X-ray Virtual Histology via Quantitative Stain Mapping** **Sep 2026**
17th International Conference on X-ray Microscopy, Campinas, Brazil
- Quantitative Virtual Histology using Single-Grid X-Ray Microtomography** **Jun 2026**
International Conference on X-ray and Neutron Phase Imaging with Gratings (XNPIG), Munich, Germany
- Quantitative Stain Mapping in X-Ray Virtual Histology** **Mar 2026**
21st European Molecular Imaging Meeting, Ljubljana, Slovenia
- Material Decomposition using Modulation-Based X-ray Phase Tomography** **Sep 2025**
IMAGING 2025, Varenna, Italy
- High-Resolution Phase-Contrast Imaging for Large Samples at Synchrotron Sources with Time-Varying Beam Profiles** **Dec 2024**
International Symposium on Medical Applications of X-ray Phase-Contrast & Photon-Counting (IMXP), Munich, Germany
- Wavefront-Marker Phase-Contrast Imaging for Centimeter-sized Samples** **Aug 2024**
15th International Conference on Synchrotron Radiation Instrumentation (SRI), Hamburg, Germany
- X-ray Dark-field Computed Tomography for Monitoring of Tissue Freezing** **Apr 2024**
International Conference on X-ray and Neutron Phase Imaging with Gratings (XNPIG), Shenzhen, China

Additional Funding

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- Awarded Synchrotron Beamtime, Principal Investigator** **Apr 2025**
PETRA III / DESY, P10 beamline, Hamburg, Germany
- Awarded Synchrotron Beamtime, Principal Investigator** **Nov 2024**
Australian Synchrotron (ANSTO), Micro-computed Tomography Beamline (MCT), Melbourne, Australia · In-kind value: €36,369

Supervision & Service

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- Co-organizer, XNPIG Conference** **Jun 2026**
Munich, Germany
- Supervisor of 4 B.Sc. Theses** **Apr 2024 – Sep 2025**
Contributions to published research

Additional Activities

Volunteer First Responder (Sanitätsdienst)

Jun 2018 – Present

Bayerisches Rotes Kreuz (BRK), Munich, Germany

- Completed foundational first-aid training (80 UE, 2018) and theoretical coursework toward the Rettungssanitäter qualification (160 UE, 2021–2022), covering basic life support, emergency-situation management, and rapid patient assessment
- Since 2022, regularly volunteer in medical standby operations at large public events, including Oktoberfest

Aerobatic Flight Scholarship

Sep 2024

Spins & More GmbH, Salzburg, Austria

- Four aerobatic flights with a military pilot instructor to improve flight safety and test emergency scenarios (e.g. spin/stall accidents, unusual attitudes)

Private Pilot License (PPL) Training

Dec 2019 – Jul 2021

Munich Flight Academy, Augsburg, Germany

- 50 hours of instructed flight time covering single-engine piston aircraft handling, takeoff/landing, and stall and emergency-procedure recovery
- Theoretical and practical training in weather assessment, route and flight planning, radio navigation, and in-flight contingency decision-making
- Successfully passed all theoretical and practical examinations, earning the PPL(A) license with an additional night rating; approx. 150 total recorded flight hours to date