

Dr. Dmitrii Briantcev

R&D Engineer | Optical Communications | Machine Learning | Testbeds

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Summary

Experienced R&D Engineer with 7 years of research experience (PhD and Postdoctoral) specializing in **Machine Learning (ML)**, optical communications, and testbed automation. Expert in **Systems Modeling**, **Free-Space Optics (FSO)**, **Adaptive Optics (AO)**, and experimental lab automation. Successfully developed real-time data pipelines and specialized ML models (**RNNs**, **GANs**) addressing complex optical phenomena, such as beam propagation and EDFA spectral hole burning, achieving prediction accuracies near noise limits.

Proven track record leading collaborative research projects with industry leaders (**Huawei**, **NTT**) and academic initiatives (**IrelandQCI**), delivering measurable improvements such as significant reductions in manual overhead and enhanced system performance. Currently pursuing roles focused on advancing next-generation communication technologies.

Core Competencies

- **Optical Communications & FSO:** Testbed Design & Automation, Fiber Optics, Free-Space Optics (FSO), Atmospheric Turbulence Modeling, Adaptive Optics (AO), Wavefront Sensing, Structured Light (LG/HG Modes), Quantum Communications.
- **Machine Learning:** Recurrent Neural Networks (RNNs), Generative Adversarial Networks (GANs), Domain-Specific Architecture Design, ML-driven Optimization, Pytorch, Tensorflow.
- **Automation & Control:** Python Scripting, VISA Instrument Control, Real-Time Data Pipelines & Logging, Automated Experiment Scheduling, Hardware/Software Integration.
- **Modeling & Simulation:** Physical Modeling (Free Space Optical and Fiber Channels), Numerical Methods, Monte Carlo Simulations, MATLAB.
- **Software & Tools:** Python, Matlab, Apache Kafka, Wolfram Mathematica, Slurm, Bash, LaTeX, Origin.
- **Languages:** English (Full Professional), Russian (Native).

Professional Experience

Research Fellow

Jun 2023 – Present

Trinity College Dublin, *CONNECT Centre for Future Networks and Communications*
Advisor: Prof. D. Kilper

Dublin, Ireland

- Lead research and development across multiple academic and industry-focused collaborations (**Huawei**, **NTT**, **IrelandQCI**), managing cross-functional activities in ML, experimental testbed automation, optical network design, and quantum communications. Coordinate technical planning, supervise progress, and ensure timely execution across projects.
- Currently leading the development of “**Twilight**,” a flexible optical network emulator and digital twin, actively contributing to its core architecture and modules. Coordinate a five-person team, guiding overall technical direction, integrating real-time telemetry with modular device models, and ensuring detailed documentation to facilitate community use and future development.
- **NTT Collaboration:** Led the design, deployment, and automation of a **400 km** long-haul optical link (Dublin–Galway via HEAnet); automated full link control, reducing manual overhead significantly and enabling centralized analysis, resulting in successful disaggregated multi-vendor field tests and experiments.
- **Huawei Optical Digital Twin:** Developed and implemented domain-specific ML models, predicting spectral hole burning in optical channels, achieving near-noise level predictions to aid dynamic capacity planning; built custom automated data pipelines and experiment automation.
- **IrelandQCI Project:** Led quantum testbed architecture design, hardware specification, and procurement; Currently supervising a student integrating QKD modules with classical systems, investigating classical/quantum co-propagation challenges.

Ph.D. Researcher

2020 – 2023

King Abdullah University of Science and Technology (KAUST)

Thuwal, Saudi Arabia

Advisors: Prof. M.-S. Alouini, Prof. B. S. Ooi

- Investigated Structured Light (SL) FSO communications; developed and applied ML approaches (**GANs**, **RNNs**) for atmospheric turbulence mitigation, leading to multiple peer-reviewed publications.
- Designed and validated crosstalk suppression methods (zero-forcing pre-coding) for Laguerre–Gaussian beams, incorporating large-scale **Monte Carlo** simulations with von Kármán turbulence modeling.
- Developed and implemented a predictive beam-wander compensation framework using RNNs, demonstrably reducing fade probability in moderate-to-strong turbulence conditions.

Student Ambassador

Approx. 2020 – 2023

King Abdullah University of Science and Technology (KAUST)

Thuwal, Saudi Arabia

- Represented KAUST academic programs and student life to prospective candidates and visitors during recruitment events and university functions.
- Promoted university initiatives through presentations and direct engagement with potential applicants.
- Assisted with orientation and onboarding activities for newly admitted students.

Teaching Assistant

2021 – 2022

King Abdullah University of Science and Technology (KAUST)

Thuwal, Saudi Arabia

- Supported graduate courses (*Optical Communications*, *Stochastic Processes*) by leading tutorial and lab sessions and mentoring students.
- Managed simulation exercises focused on statistical channel modeling using Matlab, relevant to communication principles taught in the courses.
- Contributed to curriculum refinement for the Stochastic Processes module, resulting in improved lab materials.

Education

Ph.D., Electrical & Computer Engineering

2020 – 2023

King Abdullah University of Science and Technology (KAUST)

Saudi Arabia

Thesis: *Contemporary Techniques in Emerging Free-Space Optical Communication Systems*

Supervisors: Prof. M.-S. Alouini, Prof. B. S. Ooi

M.Sc., Electrical & Computer Engineering

2018 – 2020

King Abdullah University of Science and Technology (KAUST)

Saudi Arabia

Thesis: *Crosstalk Cancellation in Structured Light FSO Communications*

Supervisor: Prof. M.-S. Alouini

B.Sc., Radiophysics

2014 – 2018

Saint Petersburg State University

Russia

Thesis: *Development of a Mode Structure in an Optical Waveguide*

Supervisor: D.Sc. M. Bisyarin

Selected Publications

(Full list and DOIs available via Google Scholar link or upon request)

- **D. Briantcev**, M. Cox, A. Trichili, B. Ooi, M.-S. Alouini, “Beam wander prediction with recurrent neural networks,” *Opt. Express* 31, 28859–28873, 2023. [DOI](#)
- J. Horgan, **D. Briantcev**, A. Kaszubowska-Anandarajah, M. Ruffini, D. Kilper, “Progress on Integrating Quantum Communications in Optical Systems Testbeds,” *ACP/POEM*, 2023. [DOI](#)
- J. M. Marin, **D. Briantcev**, et al., “Hybrid distributed acoustic sensing and Kramers–Kronig communication system over a two-mode fiber,” *OFC*, 2023. [DOI](#)
- **D. Briantcev**, M. A. Cox, A. Trichili, A. V. Drozdov, B. S. Ooi, M.-S. Alouini, “Efficient channel modeling of structured light in turbulence using GANs,” *Opt. Express* 30, 7238–7252, 2022. [DOI](#)
- A. Trichili, A. Ragheb, **D. Briantcev**, et al., “Retrofitting FSO Systems in Existing RF Infrastructure...,” *IEEE Open J. Commun. Soc.*, 2, 2597–2615, 2021. [DOI](#)
- **D. Briantcev**, A. Trichili, B. S. Ooi, M.-S. Alouini, “Crosstalk Suppression in Structured Light Free-Space Optical Communication,” *IEEE Open J. Commun. Soc.*, 1, 1623–1631, 2020. [DOI](#)