Bernard Spiegl

Helsinki, Finland

bronemos.github.io
bernard.spiegl@aalto.fi
bronemos
bernard-spiegl
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I am an enthusiastic, curious and adept engineer with an interdisciplinary background, currently working at the intersection of deep learning and neuroscience. My current research revolves around development of diffusion-based deep generative modelling approach for solving neuroscience-inspired problem; novel view synthesis. To this end, my research revolves around the development of new tools and solutions by intertwining both domain-specific and interdisciplinary knowledge.

EDUCATION

Master of Science - Signal Processing and Data Science *with honours* | Aalto University   **2021 — 2023**
with minors in **Human Neuroscience and Technology; Acoustics and Audio Technology**
- MSc thesis: ViewFusion - Learning Composable Diffusion Models for Novel View Synthesis; jointly supervised by Prof. Alexander Ilin and Prof. Stéphane Deny - arXiv preprint [PDF], press release [link]
- focus areas: Computer Vision, Neuroscience, Speech and Language Processing

Bachelor of Science - Computer Science | University of Zagreb   **2018 — 2021**
- BSc thesis: Contrastive Unpaired Translation using Focal Loss for Patch Classification; supervised by Prof. Siniša Šegvić - arXiv preprint [PDF]
- focus areas: Computer Vision, Deep Learning

EXPERIENCE

Project Employee | Aalto University | Helsinki, Finland   **OCT 2023 — PRESENT**
- Expanding on my master's thesis research as a part of Prof. Stéphane Deny's BRAIN lab.

Teaching Assistant | Aalto University | Helsinki, Finland   **2023; 2024**
- CS-E4890 - Deep Learning course, Prof. Alexander Ilin.
- Coordinated weekly in-person and remote TA sessions for over 400 enrolled students.
- Introduced experimental flipped classroom paper reading sessions for enthusiastic students.

Research Assistant | Aalto University | Helsinki, Finland   **APR 2022 — JUN 2022**
- Implemented a deep neural network architecture that combines VQ-VAE to compress the audio and an autoregressive transformer producing latent responses, in an endeavor to simulate musical call and response interaction.
- Part of a research project on usage of AI in music and creative processes coordinated by Koray Tahiroğlu in collaboration with Google Brain (Magenta Team).

Data Scientist Intern | RealNetworks Inc. | Zagreb, Croatia   **JUL 2021 — AUG 2021**
- Researched and tested deep learning architectures (CNNs, transformers, etc.) for speech classification in order to enable real-time robocall detection for the US market.

Software Engineering Intern | Koncar – Electrical Industry Inc. | Zagreb, Croatia   **JUL 2019; JUL 2020 — AUG 2020**
- Developed a GUI client for real-time network communication via Modbus protocol.
- Developed a real-time communication and data management web application for SCADA based wind turbine systems.

Undergraduate Teaching Assistant | University of Zagreb | Zagreb, Croatia   **FEB 2019 — JUL 2019**
- Assisted students during laboratory exercises in Fundamentals of Electrical Engineering.

ACHIEVEMENTS

HIIT Funding	Received funding from Helsinki Institute for Information Technology for my master's thesis research.	**2023**
Dean's Incentive Scholarship	Received a scholarship awarded by Aalto University for good academic progress.	**2022**
Google Foobar	Received an invitation to Google's Foobar secret coding challenge.	**2022**
STEM Scholarship	Received a scholarship for being among the top students on matriculation exam in fields of Mathematics and Physics.	**2018**

LEADERSHIP

Head of Maintenance & Skipper | Teekkaripurjehtijat ry | Helsinki, Finland   **2023 — 2024**
- Managing a sustainable electric sailboat refurbishment project valued at over 20,000€ in a student sailing club. Secured 4,500€ in external project funding thus far.

Ambassador | United Nations Office on Drugs and Crime | Vienna, Austria   **MAR 2018**
- Represented Croatia at an international youth forum, organised by the UNODC in the margins of 61st session of the Commission on Narcotic Drugs, delivering a statement to the policy making body and giving an interview [link].

SKILLS AND INTERESTS

Languages	Fully proficient in Python (NumPy, PyTorch, TensorFlow, Pandas, matplotlib, scikit-learn, asyncio); intermediate in C/C++, SQL, R, MATLAB, Java, bash; working knowledge of web stack (JS, HTML, CSS)
Technologies	Git, Slurm, Cluster Computing (Distributed Training, Dataset Sharding, etc.)
Professional Interests	Deep Learning, Computer Vision, Neuroscience
Personal Interests	Sailing, Music Production and Sound Design, Guitar and Piano Playing
Natural Languages	Croatian (native), English (fluent - C2 (TOEFL iBT 114/120)), German (limited), Italian (limited), Finnish (basic)