Barnabás (Barney) Börcsök

borcsok@gatech.edu • barnabasborcsok.com • barnabasborcsok
bobarna

Education

Georgia Institute of Technology **Atlanta, GA**
M.S. Computer Science, *Current GPA: 4.0/4.0* *Aug. 2023 – May 2025 (Expected)*
- Specialization in Computer Graphics
- Research-based degree with a focus on Machine Learning Methods in Computer Graphics
- Advisor: Prof. Bo Zhu, co-advised by Prof. Greg Turk

Budapest University of Technology and Economics **Budapest, Hungary**
B.S. Computer Science Engineering, Grade: 4.58/5.0 *2018 – 2023*
- Specialization in Computer Graphics
- Thesis title: Reduced Order Modeling of Fluid Dynamics
- Advisor: Prof. László Szécsi

Technical University of Munich **Munich, Germany**
Erasmus Exchange Student – Department of Informatics *2021 – 2022*
After completing 6 semesters at TU Budapest, I spent one year as an Erasmus Exchange Student at TU Munich, focusing on state-of-the-art computer graphics research.
- 1st semester: Rendering Participating Media (seminar presentation)
- 2nd semester: Deep Learning in Physics (seminar presentation)
- Completed 50 credits of coursework, including Game Physics, Advanced Physics for Deep Learning, Introduction to Deep Learning, and 3D Scanning & Motion Capture.

Teleki-Wattay School of Music and Arts **Pomáz, Hungary**
Art Student (Guitar and Theater Faculty) *2010 – 2020*

Selected Work Experience

Adobe **San Jose, CA**
Software Development Engineer Intern (Computer Graphics) *May – Aug. 2024*
- 2D Image and Geometry processing

Dassault Systèmes 3DEXCITE **Munich, Germany**
Software Engineer Intern *Apr. – Sept. 2022*
R&D Technologies, Rendering and Appearance Infrastructure Department
- Developed a 3D editor from scratch in close collaboration with an in-house artist, enhancing the workflow of creating Physically Based Rendering (PBR) materials for testing new features of Dassault Systèmes' proprietary renderer.

Budapest University of Technology and Economics **Budapest, Hungary**
Graduate Research and Teaching Assistant – 3D Computer Graphics *Feb. – Jul. 2023*
- Led exercise sessions, graded homeworks and presented the lecture on volumetric rendering.
- Research topic: physics-based deep learning, with a focus on reduced-dimensional fluid simulations.

Undergraduate Teaching Assistant – Programming 1 *Fall 2020/21*
Undergraduate Teaching Assistant – System Modelling *Spring 2019/20*

Camp Kinder Ring **New York**
Boy's side counsellor *Summer 2019*
- Sleep-away camp in upstate New York.

Skills and Interests

Computer Graphics: Physics-Based Simulation, Rendering, Machine Learning Methods

AI: Deep Learning, Physics-based Deep Learning, Scientific Machine Learning, Computer Vision

Programming: C, C++, Python, PyTorch, JavaScript, LaTeX, OpenGL, WebGL

Software Tools: Linux, Git, macOS, Microsoft Office

Honors & Awards

Full-ride scholarship: Master's degree at Georgia Tech (Naumann-Etienne Foundation, *ongoing*)

Nokia Young Scientist Award: from Nokia Bell Labs (July 2023).
- Invited talk at Nokia Skypark (Budapest Headquarters): "Controlling Laplacian Eigenfluids using Differentiable Physics".

Student scholarship: from Shapr3D (May-July 2023)

Hungarian Students' Scientific Conference (TDK) 2022: 1st place, with distinction
- Topic: Controlling 2D Laplacian Eigenfluids with Differentiable Physics
- Qualified to the 36th National Conference of the Scientific Students' Associations (OTDK, special award).

Scholarship of the Faculty of Electrical Engineering and Informatics: TU Budapest

Selected Projects & Publications

Lagrangian Covector Fluid with Free Surface
- Authors: Zhiqi Li, **Barnabás Börcsök**, Duowen Chen, Yutong Sun, Bo Zhu, and Greg Turk.
- Accepted to **ACM SIGGRAPH 2024 Conference Papers** (SIGGRAPH '24)
- https://dl.acm.org/doi/10.1145/3641519.3657514

Controlling 2D Laplacian Eigenfluids with Differentiable Physics *[Python, Φ_{Flow}, PyTorch]*
- 27th Central European Seminar on Computer Graphics (CESCG, **3rd Best Presentation Award**)
- See https://github.com/bobarna/eigenfluid-control.

Simulation of Curly Hair *[C++, OpenGL]*
- Implemented a basic hair simulation system using the Position Based Dynamics method.
- See the [Project Summary].

Fluid and Cloth Simulation *[C++, OpenGL]*
- Implemented a basic solution using the Smoothed-Particle Hydrodynamics and Position Based Dynamics methods.
- See the [Project Summary].

Interactive Voronoi Diagram *[C++, SDL2]*
- Code available at `https://github.com/bobarna/voronoi`.

Automatic Number Plate Recognition *[Python, PyTorch, OpenCV]*
- **1st place** in the semester's group homework competition for the Image Processing class at TU Budapest.
- See https://github.com/bobarna/bme-image-processing.

Vocational & Volunteering

SIGGRAPH 2023 **Los Angeles, CA**
Student Volunteer Team Leader *Aug. 2023*

SIGGRAPH 2022 **Vancouver, BC**
Student Volunteer *Aug. 2022*

Simonyi Károly College for Advanced Studies **Budapest, Hungary**
Leader of Schönherz Design Studio *2020 – 2021*
Active Member *2019 – 2023*

TUM.ai **Munich, Germany**
Active Member, Education Department *2021 – 2022*

Teleki-Wattay School of Music and Arts **Pomáz, Hungary**
Child care, instructing (Guitar Summer Camp) *Summer 2018*

Other Highlights

Language Skills: English (proficient), German (intermediate), Hungarian (native)

CG Papers & Chill Podcast: Talking about Computer Graphics papers with friends for fun. *[YouTube link]*