

# Barney (Barnabás) Börcsök

✉ pixel@barney.graphics • 🌐 barney.graphics • in barnabasborcsok • 📷 bobarna

## Education

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### Georgia Institute of Technology

Atlanta, GA

M.S. Computer Science

Aug. 2023 – May 2025

- Advisor: Prof. Bo Zhu, co-advised by Prof. Greg Turk
- Research focus: Machine Learning in Computer Graphics
- Thesis title: Differentiable 3D Scene Representations with Point-based Neural Methods

### Budapest University of Technology and Economics

Budapest, Hungary

B.S. Computer Science Engineering

2018 – 2023

- Advisor: Prof. László Szécsi
- Specialization in Computer Graphics
- Thesis title: Reduced Order Modeling of Fluid Dynamics (Controlling 2D Laplacian Eigenfluids with Differentiable Physics)

### Technical University of Munich

Munich, Germany

Erasmus Exchange Student – Department of Informatics

2021 – 2022

- Two semesters of exchange studies at TU Munich, specializing in advanced computer graphics and deep learning research.
- 1st semester: Rendering Participating Media (seminar presentation)
- 2nd semester: Deep Learning in Physics (seminar presentation)

### Teleki-Wattay School of Music and Arts

Pomáz, Hungary

Art Student (Guitar and Theater Faculty)

2010 – 2020

## Selected Work Experience

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### Adobe

San Jose, CA

Machine Learning Engineer (Drawing & Painting)

Jul. 2025 – Present

- Technology transfer collaboration: *Pose* tool (shipped in Fresco 7.0): interactive, physics-based local deformation.

Software Development Engineer Intern

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

- Collaborated closely with an in-house artist to develop a new 3D material editor, improving workflows for creating Physically-Based Rendering (PBR) materials used in testing 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

## Skills and Interests

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**Computer Graphics:** Differentiable Scene Representations, Simulation, Rendering, Machine Learning Methods

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

**Programming:** C, C++, Python, PyTorch,  $\text{\LaTeX}$ , OpenGL, WebGL, Web Development (HTML, CSS, JavaScript)

**Software Tools:** Linux, Git, macOS, Microsoft Office

## Selected Talks & Honors

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**Guest Lectures at Georgia Tech for “Computer Graphics in AI Era” (Prof. Bo Zhu):**

- Differentiable Physics & Neural Networks (Spring 2025) — <https://youtu.be/F5usbFOWvz4>
- 3D Gaussian Splatting (Spring 2025) — <https://youtu.be/MBVmQSA24Yk>

## Guest Lecture at TU Budapest – 3D Computer Graphics, Prof. László Szécsi:

- Volumetric Rendering (Spring 2023)

**Naumann-Etienne Foundation:** Full-Ride Scholarship for M.S. at Georgia Tech

**Nokia Young Scientist Award:** from Nokia Bell Labs (July 2023).

- Invited talk at Nokia Skypark (Budapest): “Controlling Laplacian Eigenfluids using Differentiable Physics”.

**Student scholarship:** from Shapr3D (May-July 2023)

**Hungarian Students’ Scientific Conference:** 1st place, with distinction (2022)

- Topic: Controlling 2D Laplacian Eigenfluids with Differentiable Physics

**Scholarship of the Faculty of Electrical Engineering and Informatics:** TU Budapest (multiple semesters)

## Selected Projects & Publications

<https://barney.graphics/projects>

### An Adjoint Method for Differentiable Fluid Simulation on Flow Maps

- Zhiqi Li, Jinjin He, **Barnabás Börcsök**, Taiyuan Zhang, Duowen Chen, Tao Du, Ming Lin, Greg Turk, Bo Zhu.
- Accepted to **ACM SIGGRAPH Asia 2025 Conference Papers**.

### Lagrangian Covector Fluid with Free Surface

- Zhiqi Li, **Barnabás Börcsök**, Duowen Chen, Yutong Sun, Bo Zhu, Greg Turk.
- **ACM SIGGRAPH 2024 Conference Papers**. <https://dl.acm.org/doi/10.1145/3641519.3657514>

### Controlling 2D Laplacian Eigenfluids with Differentiable Physics [Python, $\Phi_{Flow}$ , PyTorch]

- 27th Central European Seminar on Computer Graphics (CESCG, **3rd Best Presentation Award**)
- See <https://github.com/bobarna/eigenfluid-control>.

### Automatic Number Plate Recognition (Fall 2022) [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>.

### Simulation of Curly Hair (Fall 2020) [C++, OpenGL]

- Implemented a curly hair simulation system using the Position Based Dynamics (PBD) method.
- See [Project Summary]

### Interactive Voronoi Diagram (Fall 2019) [C++, SDL2]

- See <https://github.com/bobarna/voronoi>.

## Vocational & Volunteering

### SIGGRAPH 2023

Student Volunteer Team Leader

**Los Angeles, CA**

*Aug. 2023*

### SIGGRAPH 2022

Student Volunteer

**Vancouver, BC**

*Aug. 2022*

### Simonyi Károly College for Advanced Studies

Leader of Schönherz Design Studio (schdesign)

Active Member

**Budapest, Hungary**

*2020 – 2021*

*2019 – 2023*

### TUM.ai

Active Member, Education Department

**Munich, Germany**

*2021 – 2022*

### Teleki-Wattay School of Music and Arts

Child care, instructing (Guitar Summer Camp)

**Pomáz, Hungary**

*Summer 2018*

## Other Highlights

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

**Ultimate Frisbee:** University Frisbee Team (2019-2021), High School National Student Tournament (2nd place in 2018)