CSC2521: Seminar in Geometry and Animation

Instructed by Alec Jacobson
Class meets Tuesdays at 3pm–5pm in BA B024

This course will take a deep look at a broad collection of seminal papers in computer graphics, focusing on topics in geometry processing and computer animation. The course is structured around weekly paper readings. All students will read the same paper each week, but each student will have a unique, rotating role. This role defines the lens through which they read the paper and determines what they prepare for the group in-class discussion. Students will obtain a thorough understanding of the chosen papers and will develop their paper reading, literature review and prototyping skills. Prior exposure to computer graphics or geometry processing is suggested but not required. Students should have taken courses in Linear Algebra and Computer Programming.

Role-playing

This seminar is organized around the different "roles" students play each week: SIGGRAPH Reviewer, Archaeologist, PhD Student, Industry R&D Expert, Hacker, and Private Investigator.

- **SIGGRAPH Reviewer:** Complete a full—critical but not necessarily negative—review of the paper. Answer all questions on the SIGGRAPH Review Form.

- **Archaeologist:** Determine where this paper sits in the context of previous and subsequent work. Find and report on one older paper cited by the current paper and one newer paper citing this current paper.

- **PhD Student:** Propose an imaginary follow project not just based on the current but only possible due to the existence and success of the current paper.

- **Industry R&D Expect:** Convince us (your industry bosses) that it's worth your time and money to implement this paper into our company's pipeline. Choose an appropriate company and product or application.

- **Hacker:** Implement a small part of the paper or simplified (e.g. 2D instead of 3D) version of the paper. Prepare a demo of your work for the class.

- **Private Investigator:** Find out background information on one of the paper authors. Where have they worked? What did they study? What previous projects might have led to working on this one? We encourage you to contact the authors, but remember to be courteous, polite and on topic. Write that you're in Prof. Jacobson's seminar and include a link to this page.

- **Everyone, every week:** Come with a new title for the current paper and a missing result the paper could have included.

Email any presentation material/reviews/code/etc. to TBD Tuesday by noon before class.

Readings

TBD (one paper per week)

Coming soon to a seminar near you…

- Automatic Rigging and Animation of 3D Characters, [Baran & Popović 2007]
- An Intuitive Framework for Real-Time Freeform Modeling, [Botsch & Kobbelt 2004]
- Position Based Dynamics, [Müller et al. 2007]
- Deformation Transfer for Triangle Meshes, [Sumner & Popovic 2004]

- [Discrete Differential-Geometry Operators for Triangulated 2-Manifolds](#), [Meyer et al. 2002]

- [Good vibrations: modal dynamics for graphics and animation](#), [Pentland & Williams 1989]

- [Interactive Motion Generation from Examples](#), [Arikan & Forsyth 2002]

- [Pose Space Deformation: A Unified Approach to Shape Interpolation and Skeleton-Driven Deformation](#), [Lewis et al. 2000]

- [Real-Time Subspace Integration for St.Venant-Kirchhoff Deformable Models](#), [Barbič & James 2005]

- [Spacetime Constraints](#), [Witkin & Kass 1988]

- [Teddy: a sketching interface for 3D freeform design](#), [Igarashi et al. 1999]

- [The Heat Method for Distance Computation](#), [Crane et al. 2017]

- [Marching cubes: A high resolution 3D surface construction algorithm](#), [Lorenson & Cline 1987]