Avirup Mandal, Ph.D.

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Education

2018 – 23 ◇ **IIT Bombay**, Mumbai, India.
Ph.D., Electrical Engineering, CGPA: 9.05.
Dissertation: *Fast Remeshing-Free Methods for Complex Cutting and Fracture Simulation*.
Advisors: Prof. Parag Chaudhuri and Prof. Subhasis Chaudhuri.

2016 – 18 ◇ **IIT Bombay**, Mumbai, India.
M.Tech., Electrical Engineering, CGPA: 9.43.
Thesis: *Haptic Rendering of Submerged Objects*.
Advisor: Prof. Subhasis Chaudhuri.

2011 – 15 ◇ **Jadavpur University**, Kolkata, India.
B.E., Electronics & Telecommunication Engineering, CGPA: 9.03.

Research Interests

I am broadly interested in developing ***fast***, ***efficient*** and ***robust*** algorithms for ***physics-based animation***. I developed techniques for ***remeshing-free fracture simulation***, ***probabilistic damage mechanics*** and ***interactive virtual sculpting with haptic feedback***. I also devised an algorithm for ***non-linear Monte Carlo ray tracing***. I am also interested in ***machine learning algorithms applied to dynamic physical Systems***. I am an amateur enthusiastic in ***astrophysics*** and ***general relativity***. Given the opportunity, I wish to explore these areas more thoroughly.

Research Publications

1. **A. Mandal**, P. Chaudhuri, and S. Chaudhuri. *Remeshing-Free Graph-Based Finite Element Method for Fracture Simulation*. Computer Graphics Forum. 2022.
2. **A. Mandal**, P. Chaudhuri, and S. Chaudhuri. *Simulating Fracture in Anisotropic Materials Containing Impurities*. ACM SIGGRAPH Conference on Motion, Interaction and Games - MIG. 2022.
3. **A. Mandal**, P. Chaudhuri, and S. Chaudhuri. *Interactive Physics-Based Virtual Sculpting with Haptic Feedback*. ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games - I3D. 2022.
4. **A. Mandal**, P. Chaudhuri, and S. Chaudhuri. *Physics-based mesh deformation with haptic feedback and material anisotropy*. International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - GRAPP. 2023.
5. **A. Mandal***, K. Ayush*, and P. Chaudhuri. *Non-linear Monte Carlo Ray Tracing for Visualizing Warped Spacetime*. International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - IVAPP. 2021. (Joint first authors).
6. **A. Mandal**, D. Sardar, and S. Chaudhuri. *Haptic Rendering of Solid Object Submerged in Flowing Fluid with Environment Dependent Texture*. EuroHaptics. 2018.
7. T. Kundu, K. Lahiri, **A. Mandal**, A. Mukherjee, M. K. Naskar, and S. Sinha. *Generic Data Compression for Heart Diagnosis*. U.S. Patent 9477701 B1 2016.

Awards and Achievements

2022 ◇ **Qualcomm Innovation Fellowship** *Super-Winner*, India.
◇ **ACM Student Research Competition** *Semi-Finalist*, SIGGRAPH.

Awards and Achievements (continued)

2021 ◇ **Qualcomm Innovation Fellowship** *Winner*, India.
◇ **Best Paper Award** *Finalist*, IVAPP.
◇ **Twice Best Teaching Assistant Award**, IIT Bombay.
2016 ◇ **All India Rank 113** out of 152k candidates in *GATE* with *ECE specialization*.
2011 ◇ **State Rank 94** out of 125k candidates in *West Bengal Joint Entrance Examination*.

Skills

Languages ◇ Strong reading, writing and speaking competencies for English, Bengali.
Coding ◇ C++, C, Python, Java, OpenGL, CUDA, LaTeX.
Tools ◇ MATLAB, Houdini, Visual Studio, Eclipse, Android Studio, MeshLab.
Web Dev ◇ Html, css.

Talks

Conference Talks

2022 ◇ **Simulating Fracture in Anisotropic Materials Containing Impurities**. MIG.
◇ **Interactive Physics-Based Virtual Sculpting with Haptic Feedback**. I3D.
2021 ◇ **Non-linear Monte Carlo Ray Tracing for Visualizing Warped Spacetime.**. IVAPP.

Posters

2022 ◇ **Artist Controlled Fracture Design Using Impurity Maps**. SIGGRAPH.
2021 ◇ **Scalable Visual Simulation of Ductile and Brittle Fracture**. SIGGRAPH.

Teaching Experience

2016 – 21 ◇ **Teaching Assistant** for the following courses.
Theory – Digital Signal Processing (EE 603), Digital Communications (EE 328), Computer Vision (EE 702).
Laboratory – Digital Signal Processing System Design and Implementation (EE 750).

Research Experience

2014 ◇ **Indian Statistical Institute**, Kolkata, India.
Research Intern, Electronics and Communication Sciences Unit.
Topic: *Object Detection and Tracking in Variable Background using Fuzzy Kalman Filter*.
Mentor: Prof. Kumar Sankar Ray.

Relevant Courses

Graphics ◇ Computer Graphics, Advanced Computer Graphics.
Mathematics ◇ Applied Linear Algebra, Statistical Signal Analysis, Optimization Techniques, Engineering Statistics, Advanced Probability and Random Processes for Engineers.
Signal Processing ◇ Digital Signal Processing and its Applications, Adaptive Signal Processing, Recent Topics in Analytical Signal Processing.
Image Processing ◇ Image Processing, Computer Vision, Digital Image Processing of Remotely Sensed Data.

Relevant Courses (continued)

Machine Learning ◇ Foundations of Machine Learning, Deep Learning - Theory and Practice.

Extracurricular

Reading ◇ Novels, Short stories, popular science books.
Interests ◇ Astrophysics, Special and General Relativity, Topology, Differential Geometry.
Organiser ◇ Department of ETCE alumni meet (SANJOG '13) at Jadavpur University.

References

Available on Request