

# Martin Imre, PhD

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## EDUCATION

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### University of Notre Dame

PhD Computer Science

Notre Dame, IN

July 2016 – May 2020

*Dissertation: GPU-Accelerated Summarization and Reconstruction Techniques for Big Data Analysis and Visualization*

Advisor: Dr. Chaoli Wang

### Vienna University of Technology

Master Software Engineering & Internet Computing

Vienna, Austria

Oct. 2014 – June 2016

Thesis: *Parallelization of BVH and BSP on the GPU*

Advisor: Dr. Werner Purgathofer

### Vienna University of Technology

Bachelor Software & Information Engineering

Vienna, Austria

Oct. 2011 – June 2014

Thesis: *Android Development*

Advisor: Dr. Thomas Neubauer

## PROFESSIONAL EXPERIENCE

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### Raicon

Data Scientist, Software Developer

Vienna, Austria

Since June 2020

- Using statistical analysis to detect recurrent device faults in solar plants
- Building and maintaining an automatic fault reporting and ticketing engine for solar plant operators
- Constructing a validation and labeling infrastructure for data analysis

### University of Notre Dame

Graduate Research Assistant,

Computer Science and Engineering

Notre Dame, IN

July 2016 – May 2020

- Used deep learning techniques to reconstruct information in sparsely stored unsteady flow simulation
- Lead a team of 6 undergraduate students for designing and developing a web-based educational tool for students to learn about graph visualization
- Used novel spectral graph sparsification methods combined with a focus+context interaction to allow exploration of big graphs
- Designed a deep learning-based framework to detect salient isocontours in plasma fusion data
- Analyzed time-varying multivariate data by cross-comparison allowed through high-performance isosurface recommendation
- Introduced an iterative algorithm allowing to escape over-sampled areas in histogram methods and identifying nearly equally spaced isosurfaces
- Improved the performance of isosurface selection by 8x by deriving an approximation algorithm and using GPUs

**Argonne National Lab**

Lemont, IL

*Research Aide, MCS Department*

May 2018 – July 2018

- Designed a workflow to annotate XGC plasma fusion data for supervised learning methods
- Assembled prototypes for different deep learning models to detect "blobs" in unlabeled XGC plasma fusion data

**Virtual Reality and Visualization Research Center GmbH**

Vienna, Austria

*Junior Researcher, Semantic Modelling and Acquisition*

Oct. 2015 – June 2016

- Collaborated to write my master's thesis on "Parallelization of BVH and BSP on the GPU" under the supervision of Prof. Werner Purgathofer
- Implemented a parallel BVH creation and traversal algorithm using OpenGL and F#
- Designed a workflow to subdivide an input scene into multiple cells to create multiple memory-conform BSPs in the same framework
- Developed a software to iteratively optimize the curvature of bendable casts in 3D using a C#

**University of California**

Irvine, CA

*Researcher Intern, Secure Systems and Software Laboratory*

July 2015 – Sept. 2015

- Benchmarked different compiler security mechanism under the supervision of Prof. Michael Franz

**Virtual Reality and Visualization Research Center GmbH**

Vienna, Austria

*Junior Researcher, Semantic Modelling and Acquisition*

Feb. 2015 – June 2015

- Developed a software to iteratively optimize the curvature of bendable casts in 3D using a C#

**Project-A GmbH & Co KG (pre-startup)**

Berlin, Germany

*Software Engineering Intern, Loipline systems*

July 2014 – Sept. 2014

- Developed an automatic backend installation suite
- Designed the early-stage website
- Engineered a prototype android app

**TEACHING EXPERIENCE**

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**University of Notre Dame**

Palo Alto, CA

*Notre Dame Silicon Valley Graduate Teaching Assistant*

2020 Spring

*Operating Systems CSE 34341*

- Assisted students with assignments and graded homeworks and exams  
*Theory of Computing CSE 34151*
- Assisted students with assignments and graded homeworks and exams

**University of Notre Dame**

Notre Dame, IN

*Graduate Teaching Assistant*

2019 Fall

*Elements of Computing 1 CSE 10101/CDT 30010*

- Assisted students with assignments and graded homeworks and exams
- **Gave a guest lecture** "AI, Machine Learning, and Deep Neural Networks"

**University of Notre Dame** Notre Dame, IN  
*Graduate Teaching Assistant (Part Time)* 2018 Spring  
*Design/Analysis of Algorithms CSE 40113*

- Assisted students with homework assignments and graded exams

**University of Notre Dame** Notre Dame, IN  
*Graduate Teaching Assistant (Part Time)* 2017 Fall  
*Computer Graphics CSE 40166*

- Assisted students with homework assignments and graded exams
- Received the "**Outstanding Graduate Teaching Assistant Award**" for my work

**University of Notre Dame** Notre Dame, IN  
*Graduate Teaching Assistant* 2017 Spring  
*Design/Analysis of Algorithms CSE 40113*

- Assisted students with and graded homework assignments

**University of Notre Dame** Notre Dame, IN  
*Graduate Teaching Assistant* 2016 Fall  
*Computer Graphics CSE 40166*

- Assisted students with and graded homework assignments

**Vienna University of Technology** Vienna, Austria  
*Graduate Teaching Assistant* 2016 Winter  
*Functional Programming 185.A03*

- Assisted students with homework assignments

## **PUBLICATIONS**

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2020 **Imre, Martin**, Wenqing Chang, Shuzhan Wang, Christine Trinter and Chaoli Wang  
"GraphVisual: Design and Evaluation of a Web-Based Visualization Tool for Teaching and Learning Graph Visualization"  
Proceedings of American Society for Engineering Education Annual Conference, Montreal, Canada, Jun 2020

2020 **Imre, Martin**, Jun Tao, Yongyu Wang, Zhiqiang Zhao, Zhuo Feng, and Chaoli Wang.  
"Spectrum-preserving sparsification for visualization of big graphs."  
Computers & Graphics 87 (2020): 89-102.

2019 **Imre, Martin**, Jun Han, Julien Dominski, Michael Churchill, Ralph Kube, Choong-Seock Chang, Tom Peterka, Hanqi Guo, and Chaoli Wang  
"ContourNet: Salient Local Contour Identification for Blob Detection

- in Plasma Fusion Simulation Data"  
 Proceedings of International Symposium on Visual Computing 2019
- 2019 Tao, Jun, **Martin Imre**, Chaoli Wang, Nitesh V Chawla, Hanqi Guo, Gökhan Sever, and Seung Hyun Kim  
 "Exploring Time-Varying Multivariate Volume Data Using Matrix of Isosurface Similarity Maps"  
 IEEE Transactions on Visualization and Computer Graphics (IEEE SciVis 2018), 25(1), Jan 2019
- 2018 **Imre, Martin**, Jun Tao, and Chaoli Wang  
 "Identifying Nearly Equally Spaced Isosurfaces for Volumetric Data Sets"  
 Computers & Graphics, Volume 72, May 2018, 82-97
- 2017 **Imre, Martin**, Jun Tao, and Chaoli Wang  
 "Efficient GPU-Accelerated Computation of Isosurface Similarity Maps"  
 Pacific Visualization Symposium (PacificVis), 2017 IEEE, 180-184

## PRESENTATIONS

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- 2019 ContourNet: Salient Local Contour Identification for Blob Detection in Plasma Fusion Simulation Data  
 International Symposium on Visual Computing
- 2018 Exploring Time-Varying Multivariate Volume Data Using Matrix of Isosurface Similarity Maps  
 IEEE Visualization Conference (VIS)
- 2017 Efficient GPU-Accelerated Computation of Isosurface Similarity Maps  
 Pacific Visualization Symposium (PacificVis)

## HONORS & AWARDS

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- Outstanding Graduate Teaching Assistant 2017/2018** 2018  
 University of Notre Dame Department of Computer Science

## GRANTS & FELLOWSHIPS

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- Notebaert Professional Development Award (\$ 1,800)** 2018  
 University of Notre Dame Graduate School
- Erasmus work abroad scholarship (€ 1,098)** 2014  
 OEAD National Agency for Lifelong Learning

## SERVICES

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Conference Reviewer, ASEE Annual Conference	2020
Conference Reviewer, ChinaVis	2019
<b>Delegated Reviewer</b>	
IEEE EuroVis	2020
Information Visualization Journal	2019
IEEE Vis	2017, 2018, 2019
IEEE EuroVis	2017, 2018
IEEE PacificVis	2017, 2018

## LEADERSHIP & OUTREACH

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### **Compute Science and Engineering Graduate Student Board (GSB)** 2018 – 2019

Department of Computer Science and Engineering, University of Notre Dame

- Enabled professional development by coordinating bi-weekly student-lead talks and tutorials
- Fostered community by organizing departmental and cross-departmental social events, and creating the first ever Computer Science and Engineering Graduate Student T-shirts
- Facilitated first-year students in adapting to the PhD workload and Notre Dame culture by coordinating the student for student mentorship program
- Improved the work environment by adapting office spaces accommodate to students needs

### **Compute Science and Engineering PhD Mentor** 2018 – 2019

Department of Computer Science and Engineering, University of Notre Dame

- Supported mentee through the challenges in the first year of their PhD and helped them to plan their cross-departmental doctorate

### **Incoming Student Weekend Volunteer** 2018 – 2019

Department of Computer Science and Engineering, University of Notre Dame

- Served on the organizational team to set up a poster session, a campus tour, a housing tour, and a social program for incoming students to learn more about the department
- Guided the incoming students through the campus, and housing tour, and accompanied them to the social program

### **Graduate Student Community Event Organizer** 2016 – Present

University of Notre Dame

- Organizing social events to foster the cross-departmental community of graduate students at the University of Notre Dame for groups of 6-20 people
- Won 7 Go Grants (\$ 300 each) to cover the events' costs

## PROFESSIONAL AFFILIATIONS

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IEEE – Student Member	2016 – 2020
ASEE – Student Member	2020 – 2021

## RELEVANT SKILLS

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Languages (CEFR)	German	Native	C2
	English	Fluent	C2
	Spanish	Intermediate	B2
	Chinese	Elementary	A1
Programming	Python (7000+ hrs), C/C++ (5000+ hrs), LaTeX (3000+ hrs), Bash (3000+ hrs) JavaScript, Java, F#, C#, Haskell <i>Paradigms: Functional, Object Orientated</i>		
Frameworks	PyTorch, Keras, CUDA, Three.js, OpenGL, WebGL, Qt, PostgreSQL, Redis, Nuxt.js		
Build systems	CMake, Make, Docker, Gitlab-CI, Kubernetes		