

## EDUCATION

### University of Toronto

PhD in Computer Science

*Supervisor: Alec Jacobson*

2019 - 2024 (*expected*)

### University of Oviedo

Bachelor's Degree in Physics

2015 - 2019

### University of Oviedo

Bachelor's Degree in Mathematics

2014 - 2019

## EXPERIENCE

### Yale University

Consultant

*Supervised by Prof. Theodore Kim*

Winter 2022

### Adobe Inc.

Research Intern

*Mentored by Noam Aigerman and managed by Jovan Popovic*

May 2020 - December 2020

### Adobe Inc.

Research Intern

*Mentored by Noam Aigerman and managed by Jovan Popovic*

July 2019 - October 2019

### Fields Institute for Research in the Mathematical Sciences

Undergraduate Research Intern

*Supervised by Prof. Alec Jacobson*

Summer 2018

### Fields Institute for Research in the Mathematical Sciences

Undergraduate Research Intern

*Supervised by Prof. Alec Jacobson*

Summer 2017

### ICMAT (Institute of Mathematical Sciences)

Grant Programme Severo Ochoa - Introduction to Research

*Supervised by Prof. Javier Parcet*

2017 - 2018

## JOURNAL & CONFERENCE PUBLICATIONS

### Breaking Bad: A Dataset for Geometric Fracture and Reassembly

**Silvia Sellán\***, Yun-Chun Chen\*, Ziyi Wi\*, Animesh Garg, Alec Jacobson (*\*joint first authors*)

*Submitted to NeurIPS*

2022

### Breaking Good: Fracture Modes for Realtime Destruction

**Silvia Sellán**, Jack Luong, Leticia Mattos Da Silva, Aravind Ramakrishnan, Yuchuan Yang, Alec Jacobson

*Accepted to TBD Journal*

2022

### Sex and Gender in the Computer Graphics Research Literature

Ana Dodik\*, **Silvia Sellán\***, Theodore Kim, Amanda Philips (*\*joint first authors*)

*SIGGRAPH Talk*

2022

- Swept Volumes via Spacetime Numerical Continuation** 2021  
**Silvia Sellán**, Noam Aigerman, Alec Jacobson  
*ACM Transactions On Graphics (Proc. SIGGRAPH)*
- Opening and Closing Surfaces** 2020  
**Silvia Sellán**, Jacob Kesten, Ang Yan Sheng, Alec Jacobson  
*ACM Transactions On Graphics (Proc. SIGGRAPH Asia)*
- Developability of Heightfields via Rank Minimization** 2020  
**Silvia Sellán**, Noam Aigerman, Alec Jacobson  
*ACM Transactions On Graphics (Proc. SIGGRAPH)*
- Solid Geometry Processing on Deconstructed Domains** 2019  
**Silvia Sellán**, Heng Yi Cheng, Yuming Ma, Mitchell Dembowski, Alec Jacobson  
*Computer Graphics Forum (presented at Eurographics SGP 2019)*

## OTHER PUBLICATIONS

- Blender for Geometry Processing Academic Papers** 2022  
**Silvia Sellán**  
*Course to be presented at the Symposium on Geometry processing (SGP)*
- An introduction to GP programming in MATLAB with gptoolbox** 2021  
Hsueh-Ti Derek Liu\*, **Silvia Sellán**\*, Oded Stein\* (\*joint first authors)  
*Course presented at the Symposium on Geometry processing (SGP)*
- Efficient and Robust Swept Volumes** 2021  
**Silvia Sellán**, Noam Aigerman, Alec Jacobson  
*Poster presented at the Vector Institute Research Symposium*
- Applications of Geometry Processing to Computer Graphics** 2019  
**Silvia Sellán**  
*B.Sc. in Mathematics thesis co-supervised by Alec Jacobson and Carlos Fernández García*
- An Introduction to Primal Inflation** 2019  
**Silvia Sellán**  
*B.Sc. in Physics thesis supervised by Luigi Toffolatti*
- Solid Geometry Processing on Deconstructed Domains** 2018  
**Silvia Sellán**, Heng Yi Cheng, Yuming Ma, Mitchell Dembowski, Alec Jacobson  
*Poster presented at Eurographics SGP 2018*
- Solving PDEs on Overlapping Domains** 2018  
**Silvia Sellán**, Heng Yi Cheng, Yuming Ma, Mitchell Dembowski, Alec Jacobson  
*Extended abstract published by Review of Undergraduate Computer Science*

## PATENTS

- Swept Volume Determination Techniques** 2021  
Inventors: **Silvia Sellán**, Noam Aigerman, Alec Jacobson  
*Patent filed by Adobe Inc.*
- Generating Developable Depth Images Using Rank Minimization** 2021  
Inventors: **Silvia Sellán**, Noam Aigerman, Alec Jacobson  
*United States Patent 11080819*

## SOFTWARE

## **gptoolbox - Geometry Processing Toolbox**

Contributor and coauthor of the *gptoolbox* tutorial

## **gpytoolbox - A Python Geometry Processing Toolbox**

Author

## **libigl - A simple C++ geometry processing library**

Contributor

*Open-source code is **available on my website** for all journal publications listed above.*

## **AWARDS AND HONORS**

### **Vanier Canada Doctoral Scholarship**

2021-2024

Natural Sciences and Engineering Research Council of Canada (NSERC)

*150,000 CAD award given only to 166 graduate students across all of Canada and all academic disciplines.*

### **Adobe PhD Fellowship**

2022

Adobe Inc.

*10,000 USD award given only to ten graduate students worldwide.*

### **Dean's Doctoral Excellence Scholarship**

2021

University of Toronto Faculty of Arts & Science

*25,000 CAD given to one single doctoral student across all the University of Toronto Faculty of Arts & Science disciplines.*

### **Connaught International Scholarship for Doctoral Students**

2021

University of Toronto School of Graduate Studies

*10,000 CAD*

### **Beatrice "Trixie" Worsley Graduate Scholarship in Computer Science**

2021

University of Toronto Department of Computer Science

*4,000 CAD given yearly to a student who has taken an active role in promoting women in Computer Science.*

### **Adobe Research Fellowship**

2021

Adobe Inc.

*Honorable Mention*

### **Connaught International Scholarship for Doctoral Students**

2020

University of Toronto School of Graduate Studies

*10,000 CAD*

### **50th Anniversary Graduate Scholarship**

2020

University of Toronto Department of Computer Science

*2,000 CAD*

### **Graduate Program Award**

2020

University of Toronto Department of Computer Science

*5,000 CAD*

### **Program-level Fellowship**

2020

University of Toronto Faculty of Arts and Sciences

*1,000 CAD*

### **Adobe Research Fellowship**

2020

Adobe Inc.

*Honorable Mention*

### **Connaught International Scholarship for Doctoral Students**

2019

University of Toronto School of Graduate Studies

*10,000 CAD*

<b>Recognition of Excellence Award</b> University of Toronto Department of Computer Science 5,000 CAD	2019
<b>Graduate Program Award</b> University of Toronto Department of Computer Science 5,000 CAD	2019
<b>Program-level Fellowship</b> University of Toronto Faculty of Arts and Sciences 1,000 CAD	2019
<b>Adobe Women in Technology Scholarship</b> Adobe Inc. <i>Honorable Mention</i>	2019
<b>SenseTime Fellowship</b> MIT <i>Granted but declined</i>	2019
<b>Scholarship for Academic Excellence</b> María Cristina Masaveu Peterson Foundation 50,000 EUR	2014-2019

## ACADEMIC COMMITTEE SERVICE

<b>ACM SIGGRAPH Women in Graphics Research Community Group</b> Executive Committee Member	2022 - Present
<b>SIGGRAPH Research Career Development Committee</b> Committee member (in undergraduate mentorship subcommittee)	2021 - Present
<b>Women in Computer Graphics Research (WiGRAPH)</b> Executive Committee Member	2020 - 2022
<b>CVPR Deep Learning for Geometric Computing</b> Organizing Committee Member	2022
<b>ICCV Deep Learning for Geometric Computing</b> Program Committee Member	2021

## REFeree SERVICE

<b>CVPR DLGC Technical Papers</b>	2022
<b>ACM SIGGRAPH Technical Papers</b>	2022
<b>ACM SIGGRAPH Posters</b>	2022
<b>International Symposium on Robotics Research</b>	2022
<b>Computer Aided Design Journal (CAD-J)</b>	2022
<b>Eurographics Technical Papers</b>	2021
<b>ACM Transactions on Graphics (ToG)</b>	2021
<b>ICCV DLGC Technical Papers</b>	2021
<b>Journal of Computer Graphics Techniques (JCGT)</b>	2021
<b>ACM SIGGRAPH Posters</b>	2021

## DEPARTMENTAL SERVICE

<b>Dean's Advisory Search Committee - Department Chair, Computer Science</b> Invited Member	2021 - 2022
<b>DGP Working Group on Fostering a Safe and Inclusive Workplace</b> Member	2021 - 2022
<b>Graduate Applications Triager</b> 16 hours of paid work on processing graduate school applications	2021

## TALKS GIVEN

<b>Sex and Gender in the Computer Graphics Literature</b> SIGGRAPH Talk	August 2022 Virtual
<b>Mesh Math and Beyond: An introduction to shape representations</b> Day-long tutorial at the MIT-ran Summer Geometry Institute (SGI)	July 2022 Virtual
<b>Blender for Geometry Processing Academic Papers</b> Graduate school course at SGP 2022	July 2022 Virtual
<b>Sweeping Volumes</b> University of Toronto Undergraduate Graphics Club	March 2022 Toronto, Canada
<b>Uncertain Geometry Processing</b> Technical presentation at TomatoGRAPH 2021	December 2021 Toronto, Canada
<b>Swept Volumes via Spacetime Numerical Continuation</b> Technical Paper presentation at SIGGRAPH 2021	August 2021 Virtual (originally Los Angeles, U.S.)
<b>Mesh Math and Beyond: An introduction to shape representations</b> Day-long tutorial at the MIT-ran Summer Geometry Institute (SGI)	July 2021 Virtual
<b>An Introduction to GP Programming in MATLAB with GPTOOLBOX</b> Graduate school course at SGP 2021	July 2021 Virtual (originally Toronto, Canada)
<b>A deep dive into implicit swept volumes</b> INRIA MFX research seminar, hosted by Prof. Sylvain Lefebvre	June 2021 Virtual
<b>A deep dive into implicit swept volumes</b> MIT Vision and Graphics research seminar, hosted by Prof. Justin Solomon	June 2021 Virtual
<b>Seamless Integration of Virtual and Real World</b> Doctoral Consortium presentation at Eurographics 2021	May 2021 Virtual (originally Vienna, Austria)
<b>Differential Geometry: The Building Blocks of Computer Graphics</b> Research seminar at the Lancaster University Pure Mathematics Postgraduate Forum	March 2021 Virtual
<b>Developable Surfaces: A Case Study in Discrete Differential Geometry</b> Research seminar at the Technion hosted by Prof. Mirela Ben-Chen	December 2020 Virtual
<b>Efficient and Robust Swept Volumes</b> Technical presentation at GRAPHQUON 2020 <i>Second best presentation award</i>	December 2020 Virtual
<b>Opening and Closing Surfaces</b> Technical Paper presentation at SIGGRAPH Asia 2020	December 2020 Virtual (originally Daegu, S. Korea)
<b>Morphological operations as geometric flows on surfaces</b> Research talk at Epic Games, Inc. hosted by Dr. Ryan Schmidt	November 2020 Virtual

<b>Developable Surfaces: A Case Study in Discrete Differential Geometry</b> Research seminar at Carnegie Mellon University hosted by Prof. Keenan Crane	November 2020 Virtual
<b>Developability of Heightfields via Rank Minimization</b> Opener talk for Prof. Olga Sorkine-Hornung at the Toronto Geometry Colloquium	October 2020 Virtual
<b>Developability of Heightfields via Rank Minimization</b> Technical Paper presentation at SIGGRAPH 2020	August 2020 Virtual (originally Washington, U.S.)
<b>Solid Geometry Processing on Deconstructed Domains</b> Research talk at Stanford University hosted by Prof. Doug James	October 2019 Stanford, United States
<b>Solid Geometry Processing on Deconstructed Domains</b> Technical Paper presentation at Eurographics SGP 2019	July 2019 Milan, Italy
<b>Applications of Geometry Processing to Computer Graphics</b> B.Sc. in Mathematics Thesis Defense	June 2019 Oviedo, Spain
<b>An Introduction to Primal Inflation</b> B.Sc. in Physics Thesis Defense	June 2019 Oviedo, Spain
<b>Morphological Operations as Geometric Flows on Surfaces</b> Fields Institute Undergraduate Summer Research Program	August 2018 Toronto, Canada
<b>Morphological Operations as Geometric Flows on Surfaces</b> Department of Computer Science Undergraduate Summer Research Program	July 2018 Toronto, Canada
<b>Solving PDEs on Overlapping Domains</b> Toronto-Montreal Area Graphics Workshop	December 2017 Toronto, Canada
<b>Solving PDEs on Overlapping Domains</b> Fields Institute Undergraduate Summer Research Program	August 2017 Toronto, Canada
<b>Solving PDEs on Overlapping Domains</b> Department of Computer Science Undergraduate Summer Research Program	July 2017 Toronto, Canada

## IN THE NEWS

<i>Computer graphics researcher Silvia Sellán is awarded two prestigious scholarships</i> A&S News, written by Chris Sasaki (click to see archived version)	July 2021
<i>Silvia Sellán on Virtual Colloquium Planning</i> Q & A with WiGRAPH, written by Kate Salesin (click to see archived version)	June 2021

## ORGANIZING

<b>ACM SIGGRAPH Women in Graphics Research Community group</b> Event Coordinator: Symposium on Geometry Processing.	2022 - Present
<b>Toronto Geometry Colloquium</b> Founder, organizer and art director.	2020 - Present
<b>Summer Geometry Institute</b> Admissions committee member and session planner.	2022
<b>CVPR Deep Learning for Geometric Computing</b> Organizing Committee Member	2022
<b>Women in Graphics Research</b> Event Coordinator: Symposium on Geometry Processing.	2020 - 2021

<b>SIGGRAPH Graduate Applications Mentorship Program</b> Founder and organizer.	2021
<b>Summer Geometry Institute</b> Admissions committee member and session planner.	2021
<b>Symposium on Geometry Processing (SGP)</b> Student volunteer working on tech support full time during the conference and in Spanish-language outreach.	2021
<b>Toronto-Montreal-Waterloo Graphics Workshop (TomatoGRAPH)</b> Student volunteer	2021

## TEACHING

<b>Summer Geometry Institute</b> Instructor of a full-day tutorial including lectures, coding demos and exercises <i>Under the supervision of Professor Justin Solomon, MIT</i>	Summer 2022
<b>Symposium on Geometry Processing (SGP)</b> Lecturer of the SGP course <i>Blender for Academic Papers</i>	Summer 2022
<b>Summer Geometry Institute</b> Instructor of a full-day tutorial including lectures, coding demos and exercises <i>Under the supervision of Professor Justin Solomon, MIT</i>	Summer 2021
<b>Symposium on Geometry Processing (SGP)</b> Co-lecturer of the SGP course <i>An introduction to geometry processing programming in MATLAB with gptoolbox</i>	Summer 2021
<b>CSC165: Mathematical Expression and Reasoning for Computer Science</b> Teaching Assistant (120 hours) for Prof. David Liu	Winter 2020
<b>Individual High School Tutoring</b> Weekly paid mathematics and physics tutoring	2015-2018

## ANONYMOUS TEACHING FEEDBACK

<b>Summer Geometry Institute</b> During the summer of 2021, I planned, prepared and conducted a 6-hour long tutorial session on the topic of shape representations for undergraduate students of underrepresented communities, as part of MIT's Summer Geometry Institute (SGI). A representative sample of the anonymous feedback collected by professor Justin Solomon about my teaching is reproduced below, each quotation corresponding to different student:  <i>"Silvia Sellán's presentation was idyllic, it gave the feeling of being a duck in a pond being fed delicious crumbs of bread, the students being the duck and Silvia the feeder throwing in one after another the information that we like the ducks devoured. The presentation itself was amazing to go beyond analogy it was clear and concise towards learning the topic, the information did not feel too overwhelming, nor too brief. The exercises as well as giving focus upon them and breaking them apart into which to do at what times, they felt like the perfect amount of material in order to have us learn and test our knowledge of the topics."</i>  <i>"I just wanted to say that I really enjoyed Silvia's programme. Cutting out all the formulas definitely made her material really accessible and easy to follow without worrying about the precise details of what is going on. I think leaving these details for us to figure out by doing the exercises is really good for developing understanding, rather than having a perhaps more technical talk which is harder to follow and then not quite knowing how to approach the exercises."</i>  <i>"Silvia's lecture was the easiest to follow and the most approachable."</i>  <i>"Silvia's tutorial: Lively and engaging, I liked how a narrative that tied in everything together neatly was presented."</i>  <i>"I really liked Silvia Sellan's tutorial day because for the presentations she gave us a story illustrating the motivation behind the concepts and theory and the actual coding assignments were very accessible and did not require a lot of background material."</i>	2021
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*"I think a very good example of this was Silvia Sellan's tutorial day. She approached the advanced topics from a big picture perspective and all of the coding exercises needed "basic" MATLAB and knowledge of calculus and a small amount of linear algebra."*

*"I thoroughly enjoyed Silvia's talk and the associated exercises."*

*"I also found Silvia's talk very valuable, not only for the geometry processing material offered (which was undoubtedly great, well-structured and very accessible), but also for increasing our awareness about potential nefarious uses of geometry processing. Also the brief digressions on true diversity when talking about fonts/letters were in my opinion very welcome – I (unfortunately) tend to think in a very "westernized" way, and it's always good to bring awareness to things outside of our intellectual comfort zone."*

*"I really liked Silvia Sellán's day of the tutorial week. I think she did a really good job of creating presentations and exercises that met me where I am as a student without a formal experience in geometry processing. The mathematics and computer science that she talked as well as exercises she designed were accessible to me as someone who has undergraduate majors in mathematics and computer science as well as had participated in larger projects with programming computer graphics components. I also think she did a really good job of telling and motivating a story, which was really important to staying engaged throughout the day. I also really appreciate that she spoke about ethics in computing and the need to think critically about academic work. It's definitely something that is not spoken enough about and that needs to be spoken about more."*

*"YOU GUYS ARE WONDERFUL! Not gonna lie, I started looking at PhD opportunities to pursue this field after attending this program."*

## MENTORING

### Graduate School Applications

2020 - Present

Volunteer mentoring of dozens of prospective Computer Graphics students from underrepresented groups with their graduate school application package and decisions. Successful applicant destinations include MIT, UCSD, University of Toronto, UBC and others.

### Canada-Wide Science Fair

Spring 2022

Mentored grade 11 students with their project as part of University of Toronto's Pursue STEM

### Canadian Black Scientists Network Youth Science Fair

Winter 2022

Mentored grade 11 students with their project as part of University of Toronto's Pursue STEM

### University of Toronto DCS Graduate Applications Mentorship Program

Fall 2021

Mentor for several prospective graduate students.

### SIGGRAPH Graduate Applications Mentorship Program

Fall 2021

Mentor for several prospective graduate students.

### Fields Undergraduate Summer Research Program

Summer 2021

Graduate research mentor for a group of undergraduate researchers.

### Creating a better summer experience: A DEI workshop

Spring 2021

DEI workshop for mentors of undergraduate students, organized by the Center for Minorities in the Mathematical Sciences.

### Fields Undergraduate Summer Research Program

2020 - 2021

Graduate research mentor for a group of four undergraduate researchers.

## ANONYMOUS MENTORING FEEDBACK

### Summer Geometry Institute

2021

During the summer of 2021, I worked as a volunteer mentor for undergraduate students of underrepresented communities, as part of MIT's Summer Geometry Institute. A representative sample of the anonymous feedback about my mentoring collected by professor Justin Solomon is reproduced below, each quotation corresponding to different student:

*"I still have no idea what Silvia's role was, but she went above and beyond to help out with everything. She made us all feel welcome in the Slack channel before SGI even started and continued to dole out advice and support throughout the whole of SGI. She also patiently answered my millions of questions almost as quickly as I could ask them."*



*“Silvia ensured we all felt welcome right from the beginning of the Slack channel. When we introduced ourselves, I noticed she found something nice to say to each of us, and it felt very welcoming to have that display of friendliness right from the get-go.”*

*“Silvia Sellán, I would like to thank you specifically for the SGP & Siggraph 2021 wiggraph event, sharing your thoughts in grad school event and being accessible.”*

## **NON-ACADEMIC VOLUNTEERING**

### **Reading Partners**

*August 2020*

Translation of documents into Spanish for literacy non-profit

### **General election worker**

*April 2019*

Day-long volunteer helping citizens vote on the day of the Spanish General Elections.

### **General election worker**

*June 2016*

Day-long volunteer helping citizens vote on the day of the Spanish General Elections.