Silvia Sellán

sgsellan@cs.toronto.edu
www.silviasellan.com

EDUCATION

University of Toronto *2019 - 2024 (expected)*
PhD in Computer Science
Supervisor: Alec Jacobson

University of Oviedo *2015 - 2019*
Bachelor's Degree in Physics

University of Oviedo *2014 - 2019*
Bachelor's Degree in Mathematics

EXPERIENCE

Yale University *Winter 2022*
Research consultant
Supervised by Prof. Theodore Kim

Adobe Inc. *May 2020 - December 2020*
Research Intern
Mentored by Noam Aigerman and managed by Jovan Popovic

Adobe Inc. *July 2019 - October 2019*
Research Intern
Mentored by Noam Aigerman and managed by Jovan Popovic

Fields Institute for Research in the Mathematical Sciences *Summer 2018*
Undergraduate Research Intern
Supervised by Prof. Alec Jacobson

Fields Institute for Research in the Mathematical Sciences *Summer 2017*
Undergraduate Research Intern
Supervised by Prof. Alec Jacobson

ICMAT (Institute of Mathematical Sciences) *2017 - 2018*
Grant Programme Severo Ochoa - Introduction to Research
Supervised by Prof. Javier Parcet

JOURNAL & CONFERENCE PUBLICATIONS

Stochastic Poisson Surface Reconstruction *2022*
Silvia Sellán, Alec Jacobson
ACM Transactions on Graphics (Proc. SIGGRAPH Asia)

Breaking Bad: A Dataset for Geometric Fracture and Reassembly *2022*
Silvia Sellán*, Yun-Chun Chen*, Ziyi Wi*, Animesh Garg, Alec Jacobson *(*joint first authors)*
NeurIPS Datasets and Benchmarks

Breaking Good: Fracture Modes for Realtime Destruction *2022*
Silvia Sellán, Jack Luong, Leticia Mattos Da Silva, Aravind Ramakrishnan, Yuchuan Yang, Alec Jacobson
ACM Transactions On Graphics (to be presented at SIGGRAPH Asia)

Sex and Gender in the Computer Graphics Research Literature *2022*
Ana Dodik*, **Silvia Sellán***, Theodore Kim, Amanda Philips *(*joint first authors)*
SIGGRAPH Talk

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, Herng 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 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, Herng Yi Cheng, Yuming Ma, Mitchell Dembowski, Alec Jacobson
Poster presented at Eurographics SGP 2018

Solving PDEs on Overlapping Domains *2018*
Silvia Sellán, Herng 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.

Connaught International Scholarship for Doctoral Students *2022*
University of Toronto School of Graduate Studies
10,000 CAD

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

Recognition of Excellence Award *2019*
University of Toronto Department of Computer Science
5,000 CAD

Graduate Program Award *2019*
University of Toronto Department of Computer Science
5,000 CAD

Program-level Fellowship *2019*
University of Toronto Faculty of Arts and Sciences
1,000 CAD

Adobe Women in Technology Scholarship *2019*
Adobe Inc.
Honorable Mention

SenseTime Fellowship *2019*
MIT
Granted but declined

Scholarship for Academic Excellence *2014-2019*
María Cristina Masaveu Peterson Foundation
50,000 EUR

ACADEMIC COMMITEE SERVICE

ACM SIGGRAPH Women in Graphics Research Community Group *2022 - Present*
Executive Committee Member

SIGGRAPH Research Career Development Committee *2021 - Present*
Committee member (in undergraduate mentorship subcommittee)

Women in Computer Graphics Research (WiGRAPH) *2020 - 2022*
Executive Committee Member

CVPR Deep Learning for Geometric Computing *2022*
Organizing Committee Member

ICCV Deep Learning for Geometric Computing *2021*
Program Committee Member

REFEREE SERVICE

Eurographics Technical Papers *2022*

CVPR DLGC Technical Papers *2022*

ACM SIGGRAPH Technical Papers *2022*

ACM SIGGRAPH Posters *2022*

International Symposium on Robotics Research *2022*

Computer Aided Design Journal (CAD-J) *2022*

Eurographics Technical Papers *2021*

ACM Transactions on Graphics (ToG) *2021*

ICCV DLGC Technical Papers *2021*

Journal of Computer Graphics Techniques (JCGT) *2021*

ACM SIGGRAPH Posters *2021*

DEPARTMENTAL SERVICE

Faculty of Arts and Science Graduate Diversity Working Group *2022*
Invited Member

Dean's Advisory Search Committee - Department Chair, Computer Science *2021 - 2022*
Invited Member

DGP Working Group on Fostering a Safe and Inclusive Workplace *2021 - 2022*
Member

DCS Grad program talk for Ukranian undergraduate visiting students *2022*
Panelist

Graduate Applications Triager *2021*
16 hours of paid work on processing graduate school applications

TALKS GIVEN

Title TBD *March 2023*
UCLA and CalTech's *Grundfest Memorial Lecture*, invited by Profs. Achuta Kadambi and Katie Bowman *Virtual*

Stochastic Poisson Surface Reconstruction *December 2022*
SIGGRAPH Asia Technical Papers talk *Daegu, South Korea*

Breaking Good: Fracture Modes for Realtime Simulation *December 2022*
SIGGRAPH Asia Technical Papers talk *Daegu, South Korea*

Sex and Gender in the Computer Graphics literature *November 2022*
Queer in AI @ NeurIPS workshop *New Orleans, U.S.*

Breaking Bad: A Dataset for Geometric Fracture Reassembly *November 2022*
NeurIPS technical paper presentation *New Orleans, U.S.*

Moving fast, breaking things, and putting them back together *November 2022*
McGill Computer Graphics seminar hosted by Profs. Paul Kry and Derek Nowrouzezahrai *Montreal, Canada*

Moving fast, breaking things, and putting them back together *November 2022*
Invited Speaker at Ubisoft and Ubisoft LaForge *Montreal, Canada*

Sex and Gender in the Computer Graphics literature *November 2022*
Talk at UNC Chapel Hill invited by Professor Roni Sengupta *Virtual*

Virtual Bodies that Matter: A Trans Researcher's Career in Computer Graphics *November 2022*
Georgetown's Gender, Film and Media Studies Seminar, hosted by Prof. Amanda Phillips *Washington, D.C., U.S.*

Uncertain Surface Reconstruction *November 2022*
John Hopkins University Computer Graphics Seminar hosted by Prof. Misha Kazhdan *Baltimore, U.S.*

Uncertain Surface Reconstruction *November 2022*
Columbia University Computer Graphics Seminar hosted by Prof. Changxi Zheng *New York City, U.S.*

Uncertain Surface Reconstruction *November 2022*
NYU Computer Graphics Seminar hosted by Prof. Daniele Panozzo *New York City, U.S.*

Uncertain Surface Reconstruction *November 2022*
MIT Computer Graphics Seminar hosted by Prof. Justin Solomon *Cambridge, U.S.*

Uncertain Surface Reconstruction *November 2022*
Inaugural Yale *Rising Stars* seminar hosted by Prof. Theodore Kim *New Haven, U.S.*

Uncertain Surface Reconstruction *November 2022*
Dartmouth Computer Graphics Seminar hosted by Prof. Wojciech Jarosz *Hanover, U.S.*

Moving fast, breaking things, and putting them back together *November 2022*
Engineering and Applied Science Forum *Virtual*

Blender for academic papers *October 2022*
Toronto Geometry and Architecture Summit *Toronto, Canada*

Sex and Gender in the Computer Graphics Literature *August 2022*
SIGGRAPH Talk *Vancouver, Canada*

Mesh Math and Beyond: An introduction to shape representations *July 2022*
Day-long tutorial at the MIT-ran Summer Geometry Institute (SGI) *Virtual*

Blender for Geometry Processing Academic Papers *July 2022*
Graduate school course at SGP 2022 *Virtual*

Sweeping Volumes *March 2022*
University of Toronto Undergraduate Graphics Club *Toronto, Canada*

Uncertain Geometry Processing *December 2021*
Technical presentation at TomatoGRAPH 2021 *Toronto, Canada*

Swept Volumes via Spacetime Numerical Continuation *August 2021*
Technical Paper presentation at SIGGRAPH 2021 *Virtual (originally Los Angeles, U.S.)*

Mesh Math and Beyond: An introduction to shape representations *July 2021*
Day-long tutorial at the MIT-ran Summer Geometry Institute (SGI) *Virtual*

An Introduction to GP Programming in MATLAB with GPToolbox *July 2021*
Graduate school course at SGP 2021 *Virtual (originally Toronto, Canada)*

A deep dive into implicit swept volumes *June 2021*
INRIA MFX research seminar, hosted by Prof. Sylvain Lefebvre *Virtual*

A deep dive into implicit swept volumes *June 2021*
MIT Vision and Graphics research seminar, hosted by Prof. Justin Solomon *Virtual*

Seamless Integration of Virtual and Real World *May 2021*
Doctoral Consortium presentation at Eurographics 2021 *Virtual (originally Vienna, Austria)*

Differential Geometry: The Building Blocks of Computer Graphics *March 2021*
Research seminar at the Lancaster University Pure Mathematics Postgraduate Forum *Virtual*

Developable Surfaces: A Case Study in Discrete Differential Geometry *December 2020*
Research seminar at the Technion hosted by Prof. Mirela Ben-Chen *Virtual*

Efficient and Robust Swept Volumes *December 2020*
Technical presentation at GRAPHQUON 2020 *Virtual*
Second best presentation award

Opening and Closing Surfaces *December 2020*
Technical Paper presentation at SIGGRAPH Asia 2020 *Virtual (originally Daegu, S. Korea)*

Morphological operations as geometric flows on surfaces *November 2020*
Research talk at Epic Games, Inc. hosted by Dr. Ryan Schmidt *Virtual*

Developable Surfaces: A Case Study in Discrete Differential Geometry *November 2020*
Research seminar at Carnegie Mellon University hosted by Prof. Keenan Crane *Virtual*

Developability of Heightfields via Rank Minimization *October 2020*
Opener talk for Prof. Olga Sorkine-Hornung at the Toronto Geometry Colloquium *Virtual*

Developability of Heightfields via Rank Minimization *August 2020*
Technical Paper presentation at SIGGRAPH 2020 *Virtual (originally Washington, U.S.)*

Solid Geometry Processing on Deconstructed Domains *October 2019*
Research talk at Stanford University hosted by Prof. Doug James *Stanford, United States*

Solid Geometry Processing on Deconstructed Domains *July 2019*
Technical Paper presentation at Eurographics SGP 2019 *Milan, Italy*

Applications of Geometry Processing to Computer Graphics *June 2019*
B.Sc. in Mathematics Thesis Defense *Oviedo, Spain*

An Introduction to Primal Inflation *June 2019*
B.Sc. in Physics Thesis Defense *Oviedo, Spain*

Morphological Operations as Geometric Flows on Surfaces *August 2018*
Fields Institute Undergraduate Summer Research Program *Toronto, Canada*

Morphological Operations as Geometric Flows on Surfaces *July 2018*
Department of Computer Science Undergraduate Summer Research Program *Toronto, Canada*

Solving PDEs on Overlapping Domains *December 2017*
Toronto-Montreal Area Graphics Workshop *Toronto, Canada*

Solving PDEs on Overlapping Domains *August 2017*
Fields Institute Undergraduate Summer Research Program *Toronto, Canada*

Solving PDEs on Overlapping Domains *July 2017*
Department of Computer Science Undergraduate Summer Research Program *Toronto, Canada*

IN THE NEWS

Computer graphics researcher Silvia Sellán is awarded two prestigious scholarships *July 2021*
A&S News, written by Chris Sasaki (click to see archived version)

Silvia Sellán on Virtual Colloquium Planning *June 2021*
Q & A with WiGRAPH, written by Kate Salesin (click to see archived version)

ORGANIZING

ACM SIGGRAPH Women in Graphics Research Community group *2022 - Present*
Event Coordinator: Symposium on Geometry Processing.

Toronto Geometry Colloquium *2020 - Present*
Founder, organizer and art director.

SIGGRAPH Graduate Applications Mentorship Program *2022*
Founder and organizer.

Summer Geometry Institute *2022*
Admissions committee member and session planner.

CVPR Deep Learning for Geometric Computing *2022*
Organizing Committee Member

Women in Graphics Research *2020 - 2021*
Event Coordinator: Symposium on Geometry Processing.

SIGGRAPH Graduate Applications Mentorship Program *2021*
Founder and organizer.

Summer Geometry Institute *2021*
Admissions committee member and session planner.

Symposium on Geometry Processing (SGP) *2021*
Student volunteer working on tech support full time during the conference and in Spanish-language outreach.

Toronto-Montreal-Waterloo Graphics Workshop (TomatoGRAPH) *2021*
Student volunteer

TEACHING

Summer Geometry Institute Summer 2022
Instructor of a full-day tutorial including lectures, coding demos and exercises
Under the supervision of Professor Justin Solomon, MIT

Symposium on Geometry Processing (SGP) *Summer 2022*
Lecturer of the SGP course *Blender for Academic Papers*

Summer Geometry Institute *Summer 2021*
Instructor of a full-day tutorial including lectures, coding demos and exercises
Under the supervision of Professor Justin Solomon, MIT

Symposium on Geometry Processing (SGP) *Summer 2021*
Co-lecturer of the SGP course *An introduction to geometry processing programming in MATLAB with gptoolbox*

CSC165: Mathematical Expression and Reasoning for Computer Science *Winter 2020*
Teaching Assistant (120 hours) for Prof. David Liu

Individual High School Tutoring *2015-2018*
Weekly paid mathematics and physics tutoring

ANONYMOUS TEACHING FEEDBACK

Summer Geometry Institute *2021*
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:

"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 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."

"Silvia's lecture was the easiest to follow and the most approachable."

"Silvia's tutorial: Lively and engaging, I liked how a narrative that tied in everything together neatly was presented."

"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 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.