Silvia Sellán  
University of Toronto  
Department of Computer Science  
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Education

University of Toronto  
PhD in Computer Science — Supervised by Prof. Alec Jacobson  
2019 - 2024 (expected)

University of Oviedo  
BSc in Mathematics and BSc in Physics  
2014 - 2019

Experience

Yale University  
Research Consultant — Supervised by Prof. Theodore Kim  
Winter 2022

Adobe Research  
Research Intern — Mentored by Dr. Noam Aigerman and Supervised by Dr. Jovan Popovic  
Summer 2020

Adobe Research  
Research Intern — Mentored by Dr. Noam Aigerman and Supervised by Dr. Jovan Popovic  
Summer 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  
Summer 2017

Publications

Bayes’ Rays: Uncertainty Quantification for Neural Radiance Fields  
Lily Goli, Cody Reading, Silvia Sellán, Alec Jacobson, Andrea Tagliasacchi  
CVPR 2024 (Highlight)

Reach for the Spheres: Tangency-Aware Surface Reconstruction of SDFs  
Silvia Sellán, Christopher Batty, Oded Stein  
SIGGRAPH Asia 2023

Neural Stochastic Screened Poisson Reconstruction  
Silvia Sellán, Alec Jacobson  
SIGGRAPH Asia 2023

Constructive Solid Geometry on Neural Signed Distance Fields  
Zoë Marschner, Silvia Sellán, Hsueh-Ti Derek Liu, Alec Jacobson  
SIGGRAPH Asia 2023

Stochastic Poisson Surface Reconstruction  
Silvia Sellán, Alec Jacobson  
SIGGRAPH Asia 2022

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

Breaking Good: Fracture Modes for Realtime Destruction  
Silvia Sellán, Jack Luong, Leticia Mattos Da Silva, Aravind Ramakrishnan, Yuchuan Yang, Alec Jacobson  
SIGGRAPH Asia 2022

Sex and Gender in the Computer Graphics Research Literature  
Ana Dodik*, Silvia Sellán*, Amanda Phillips, Theodore Kim  
SIGGRAPH Talk 2022
Swept Volumes via Spacetime Numerical Continuation
Silvia Sellán, Noam Aigerman, Alec Jacobson
SIGGRAPH 2021

Opening and Closing Surfaces
Silvia Sellán, Jacob Kesten, Yan Sheng Ang, Alec Jacobson
SIGGRAPH Asia 2020

Developability of Heightfields via Rank Minimization
Silvia Sellán, Noam Aigerman, Alec Jacobson
SIGGRAPH 2020

Solid Geometry Processing on Deconstructed Domains
Silvia Sellán, Herng Yi Cheng, Yuming Ma, Mitchell Dembowski, Alec Jacobson
ACM / Eurographics Symposium on Geometry Processing 2019

Other Publications

Geometry Synthesis for Critical Applications
Silvia Sellán
SIGGRAPH Asia Doctoral Consortium, 2023

Efficient and Robust Swept Volumes
Silvia Sellán, Noam Aigerman, Alec Jacobson
Vector Institute Research Symposium poster, 2021

Applications of Geometry Processing to Computer Graphics
Silvia Sellán
B.Sc. in Mathematics thesis co-supervised by Profs. Alec Jacobson and Carlos Fernández García

An Introduction to Primal Inflation
Silvia Sellán
BSc in Physics thesis supervised by Prof. Luigi Toffolatti

Solid Geometry Processing on Deconstructed Domains
Silvia Sellán, Herng Yi Cheng, Yuming Ma, Mitchell Dembowski, Alec Jacobson
ACM / Eurographics SGP Poster, 2018

Patents

Swept Volume Determination Techniques
Silvia Sellán, Noam Aigerman, Alec Jacobson
Filed by Adobe Inc. in 2021

Generating Developable Depth Images Using Rank Minimization
Silvia Sellán, Noam Aigerman, Alec Jacobson
United States Patent No. 11080819, 2021

Software

Gpytoolbox: A Python geometry processing toolbox
Silvia Sellán, Oded Stein
A library of general geometry processing Python research utility functions, including basic procedural meshes, differential geometric operators, bounding volume hierarchies and surface reconstruction from point clouds and SDFs.

Awards

DiDi Graduate Student Award in Computer Science
University of Toronto Department of Computer Science — 10,000 CAD

Vanier Canada Doctoral Scholarship
Natural Sciences and Engineering Research Council of Canada (NSERC) — 150,000 CAD
Awarded to 166 graduate students across all of Canada and all academic disciplines.
Connaught International Scholarship for Doctoral Students
University of Toronto School of Graduate Studies — 50,000 CAD

EECS Rising Stars
Academic Career Workshop in EECS — Travel Funding

HLF Ernst Abbe Grant
Heidelberg Laureate Forum — Travel Funding

Beatrice "Trixie" Worsley Graduate Scholarship in Computer Science
University of Toronto Department of Computer Science — 8,000 CAD
Awarded to a student who has taken an active role in promoting women in Computer Science.

Adobe PhD Fellowship
Adobe Inc. — 10,000 USD

Dean's Doctoral Excellence Scholarship
University of Toronto Faculty of Arts & Science — 25,000 CAD
Awarded to a single doctoral student across all the University of Toronto Faculty of Arts & Science disciplines.

Adobe Research Fellowship
Adobe Inc. — Honorable mention

50th Anniversary Graduate Scholarship
University of Toronto Department of Computer Science — 2,000 CAD

Graduate Program Award
University of Toronto Department of Computer Science — 10,000 CAD

Recognition of Excellence Award
University of Toronto Department of Computer Science — 10,000 CAD

Adobe Women in Technology Scholarship
Adobe Inc. — Honorable Mention

SenseTime Fellowship
MIT — Granted but declined

Scholarship for Academic Excellence
Maria Cristina Masaveu Peterson Foundation — 50,000 EUR

Academic Service

Summer Geometry Initiative
Steering Committee Member

ACM / Eurographics Symposium on Geometry Processing (SGP)
Graduate School Chair

ACM SIGGRAPH Women in Graphics Research Community Group
Executive Committee Member

SIGGRAPH Research Career Development Committee
Committee Member (in Undergraduate Mentorship Subcommittee)

ACM / Eurographics Symposium on Geometry Processing (SGP)
Session Chair: Representation and Learning

ACM / Eurographics Symposium on Geometry Processing (SGP)
International Program Committee Member

ACM / Eurographics Symposium on Geometry Processing (SGP)
International Program Committee Member

CVPR Deep Learning for Geometric Computing
Organizing Committee Member

Women in Computer Graphics Research (WiGRAPH)
Executive Committee Member

CVPR Deep Learning for Geometric Computing
Organizing Committee Member
Referee Service

ACM SIGGRAPH Technical Papers 2024
ACM SIGGRAPH Asia Technical Papers 2023
ACM / Eurographics Symposium on Geometry Processing (SGP) 2023
ACM SIGGRAPH Technical Papers 2022 - 2023
Eurographics Technical Papers 2021 - 2023
ACM Transactions on Graphics (ToG) 2021 - 2023
IEEE Transactions on Pattern Analysis and Machine Intelligence 2023
The Visual Computer (TVCJ) 2023
CVPR DLGC Technical Papers 2022
International Symposium on Robotics Research 2022
Computer Aided Design Journal (CAD-J) 2022
ACM SIGGRAPH Posters 2021 - 2022
ICCV DLGC Technical Papers 2021
Journal of Computer Graphics Techniques (JCGT) 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

Stochastic Computer Graphics
University of Waterloo Computer Science Seminar — *hosted by Prof. Craig Kaplan* Waterloo (Canada) — January 2024
University of Victoria Computer Science Seminar — *hosted by Prof. Teseo Schneider* Victoria (Canada) — February 2024
Max Planck Institute for Informatics Seminar — *hosted by Prof. Christopher Theobalt* Saarbrücken (Germany) — February 2024
Johns Hopkins University Computer Science Seminar — *hosted by Prof. Misha Kazhdan* Baltimore (United States) — February 2024
Institute of Science and Technology Austria — *hosted by Prof. Chris Wojtan* Vienna (Austria) — February 2024
Caltech Computer Science Seminar — *hosted by Prof. Aaron Ames* Pasadena (United States) — March 2024
Brown University Computer Science Seminar — *hosted by Prof. Daniel Ritchie* Providence (United States) — March 2024
Columbia University Computer Science Seminar — *hosted by Prof. Changxi Zheng* New York City (United States) — March 2024
MIT Computer Science Seminar — *hosted by Prof. William Freeman* Cambridge (United States) — March 2024
Princeton University Computer Science Seminar — *hosted by Prof. Adam Finkelstein* Princeton (United States) — March 2024
CMU Computer Science Seminar — *hosted by Prof. Keenan Crane* Pittsburgh (United States) — March 2024

Uncertainty Quantification in 3D Geometric Synthesis
University of Zaragoza Graphics and Imaging seminar — *hosted by Prof. Ana Serrano* Virtual — November 2023
Brown University Graphics seminar — *hosted by Prof. Daniel Ritchie* Virtual — October 2023
Banff International Research Station 3D Generative Modeling Workshop — *Invited talk* Banff (Canada) — July 2023

Geometry +: Uncertain Surface Reconstruction
Ecole polytechnique Graphics seminar — *hosted by Prof. Maks Ovsjanikov* Paris (France) — July 2023
INRIA seminar — hosted by Profs. Bruno Lévy and Sylvain Lefebvre
University of Navarra Graphics and Vision seminar — hosted by Prof. Asier Marzo
University of Edinburgh Geometry seminar — hosted by Prof. Amir Vaxman
Adobe Research seminar — hosted by Dr. Valentin Deschaintre
University College London Vision seminar — hosted by Prof. Kaan Aksit
University of British Columbia Graphics seminar — hosted by Prof. Alla Sheffer
Simon Fraser University Vision seminar — hosted by Prof. Andrea Tagliasacchi
EPFL Graphics seminar — hosted by Prof. Mark Pauly
ETH Graphics seminar — hosted by Prof. Olga Sorkine-Hornung
University of Waterloo Graphics seminar — hosted by Prof. Craig Kaplan
University of Montreal Graphics seminar — hosted by Prof. Mikhail Bessmeltsev
Johns Hopkins Graphics seminar — hosted by Prof. Misha Kazhdan
Columbia University Graphics seminar — hosted by Prof. Changxi Zheng
New York University Graphics seminar — hosted by Prof. Daniele Panozzo
MIT Graphics seminar — hosted by Prof. Justin Solomon
Dartmouth Graphics and Rendering seminar — hosted by Prof. Wojciech Jarosz
TomatoGRAPH — Technical Talk

Mesh Math and Beyond: An introduction to shape representations
Summer Geometry Initiative — Full-day tutorial
Summer Geometry Initiative — Full-day tutorial
Summer Geometry Initiative — Full-day tutorial
Blender for Academic Papers
Graphics Interface — Invited Course
Geometry and Architecture Summit — Invited Talk
ACM / Eurographics SGP — Invited Course

Geometry +: Moving Fast, Breaking Things and Putting Them Back Together
University of Southern California Graphics seminar — hosted by Prof. Oded Stein
McGill University Graphics seminar — hosted by Prof. Oded Stein
Ubisoft research seminar — hosted by the La Forge team
Yale University Rising Stars seminar — hosted by Prof. Theodore Kim
Engineering and Applied Science Forum — hosted by the EASF team

Uncertain Surface Reconstruction
UCLA and CalTech’s Grundfest Memorial Lecture — hosted by Profs. Achuta Kadambi and Katie Bouman

Research in Geometry Processing
University of Toronto Undergraduate Graphics Club — Invited Talk

Stochastic Poisson Surface Reconstruction
ACM SIGGRAPH Asia — Technical Paper presentation

Breaking Good: Fracture Modes for Realtime Destruction
ACM SIGGRAPH Asia — Technical Paper presentation

Breaking Bad: A Dataset for Geometric Fracture Reassembly
NeuIPS — Featured oral paper presentation

Virtual Bodies that Matter: A Trans Researcher’s Career in Computer Graphics
Georgetown’s Gender and Media Seminar — hosted by Prof. Amanda Phillips

Sex and Gender in the Computer Graphics Literature
Queer in AI @ NeuIPS workshop — Invited Talk
UNC Chapel Hill — hosted by Prof. Roni Sengupta

A Deep Dive into Implicit Swept Volumes
University of Toronto Undergraduate Graphics Club — Invited Talk
INRIA MFX research seminar — hosted by Prof. Sylvain Lefebvre
MIT Graphics research seminar — hosted by Prof. Justin Solomon
GraphQUON — Technical presentation  
Virtual — December 2020

Swept Volumes via Spacetime Numerical Continuation  
ACM SIGGRAPH — Technical Paper presentation  
Virtual (originally Los Angeles) — August 2021

An Introduction to GP Programming in MATLAB with Gptoolbox  
ACM / Eurographics SGP — Invited Course  
Virtual — July 2021

Developable Surfaces: A Case Study in Discrete Differential Geometry  
Lancaster University Pure Mathematics Postgraduate Forum — Invited Talk  
Virtual — March 2021
Technion research seminar — hosted by Prof. Mirela Ben-Chen  
Virtual — December 2020
Carnegie Mellon University Geometry seminar — hosted by Prof. Keenan Crane  
Virtual — November 2020

Seamless Integration of Virtual and Real World  
Eurographics 2021 — Doctoral Consortium talk  
Virtual (originally Vienna) — May 2021
University of Toronto — PhD Qualifying Exam  
Toronto (Canada) — September 2020

Opening and Closing Surfaces  
ACM SIGGRAPH Asia — Technical Paper presentation  
Virtual (originally Daegu) — December 2020
Epic Games — hosted by Dr. Ryan Schmidt  
Virtual — November 2020
Fields Institute Undergraduate Summer Research Program — End-of-summer research talk  
Toronto (Canada) — August 2017
University of Toronto DCS Summer Research Program — Mid-summer research talk  
Toronto (Canada) — July 2017

Developability of Heightfields via Rank Minimization  
Toronto Geometry Colloquium — Opener talk for Prof. Olga Sorkine-Hornung  
Virtual — October 2020
SIGGRAPH 2020 — Technical Paper presentation  
Virtual (originally Washington, D.C.) — August 2020

Solid Geometry Processing on Deconstructed Domains  
Stanford University Graphics seminar — hosted by Prof. Doug James  
Stanford (United States) — October 2019
ACM / Eurographics SGP — Technical Paper presentation  
Milan (Italy) — July 2019
Toronto-Montreal Area Graphics workshop — Technical talk  
Toronto (Canada) — December 2017
Fields Institute Undergraduate Summer Research Program — End-of-summer research talk  
Toronto (Canada) — August 2017
University of Toronto DCS Summer Research Program — Mid-summer research talk  
Toronto (Canada) — July 2017

Applications of Geometry Processing to Computer Graphics  
University of Oviedo — B.Sc. in Mathematics Thesis Defense  
Oviedo (Spain) — June 2019

An Introduction to Primal Inflation  
University of Oviedo — B.Sc. in Physics Thesis Defense  
Oviedo (Spain) — June 2019

News

What Do Food and Research Have in Common? More Than You Might Think  
Spektrum.de, written by Nina Beier  
January 2024

Computer graphics researcher Silvia Sellán is awarded two prestigious scholarships  
A&S News, written by Chris Sasaki  
July 2021

Silvia Sellán on Virtual Colloquium Planning  
Q&A with WiGRAPH, written by Kate Salesin  
June 2021

Organizing

ACM SIGGRAPH Women in Graphics Research Community group  
2023
Undergraduate Outreach Coordinator

CVPR Deep Learning for Geometric Computing Workshop  
2023
Organizing Committee Member

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

Toronto Geometry Colloquium  
2020 - 2023
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 Workshop 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 Initiative 2021, 2022, 2023
Instructor of a full-day tutorial including lectures, coding demos and exercises

Graphics Interface Summer 2023
Lecturer of the course Blender for Academic Papers

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

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

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 Sellán’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 Sellán’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

Summer Geometry Initiative 2023
Served as the mentor for two two-week long geometry processing research projects for eight undergraduate students.

Graduate School Applications 2020 - 2023
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 four 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.

Mentoring Feedback

Summer Geometry Institute 2021, 2023
During the summers of 2021 and 2023 (the latter together with my colleague Ana Dodik), I worked as a mentor for MIT’s Summer Geometry Initiative, founded by Professor Justin Solomon. In it, I directed two projects for two groups of undergraduate students from underrepresented communities new to geometry processing. Below is a representative sample of the anonymous feedback collected by Prof. Solomon

Ana and Silvia built a collaborative, safe, open environment for new ideas. Both taught us a lot about how to research and approach problems with different approaches. They are outstanding researchers that I admire even more now.

Ana and Silvia are both absolutely fantastic mentors!

This week has been great! Ana and Silvia are excellent mentors. They created an excellent environment for us to learn and collaborate
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 WiGraph event, sharing your thoughts in grad school event and being accessible.

**Volunteering**

| Role                        | Date       |
|-----------------------------|------------|
| **General election worker** | July 2023  |
| Day-long volunteer helping citizens vote on the day of the Spanish General Elections. |
| **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. |