

Patrick Sanan  
[patrick.sanan@gmail.com](mailto:patrick.sanan@gmail.com), [sananp@usi.ch](mailto:sananp@usi.ch)  
[patrickssanan.com](http://patrickssanan.com)

## Education

2007-2013 : **Ph.D.** Applied and Computational Mathematics  
California Institute of Technology (Caltech)  
Pasadena, California, United States

2006-2007 : **MusM** Electroacoustic Music Composition  
University of Manchester  
Manchester, England, United Kingdom  
With Distinction

2002-2006 : **B.S.** Aerospace Engineering, **B.A.** Mathematics-Applied Science, **Minor** Music  
Revelle College, University of California, San Diego (UCSD)  
La Jolla, California, United States  
Summa Cum Laude

1998-2002 : **Diploma**  
Las Lomas High School  
Walnut Creek, California, United States

## Publications, Posters, and Preprints

- Patrick Sanan, “Pipelined, Flexible Krylov Methods” [poster, lightning talk], PETSc-20 Conference, June 15-18, Argonne National Laboratory, United States.
- Patrick Sanan, Dave A. May, Olaf Schenk, Karl Rupp, “Aggressive Local Smoothing on Accelerators for Stokes Flow” [poster], PASC 2015, June 1-3, Zurich, Switzerland.
- Sascha M. Schnepp, Patrick Sanan, Dave A. May, “Pipelined Flexible Krylov Subspace Methods for Large-Scale Computing” [poster], PASC 2015, Zurich, Switzerland.
- Patrick Sanan, “Aggressive Accelerator-enabled Local Smoothing via Incomplete Factorization, with Applications” [poster], HPCSE 2015, May 25-28, Ostrava, Czech Republic.
- Patrick Sanan, Sascha M. Schnepp, Dave A. May, “Pipelined, Flexible Krylov Subspace Methods” [poster], EGU General Assembly, April 13-17, 2015, Vienna, Austria

- Patrick Sanan, “Fine-Grained ILU Methods for Aggressive Smoothing in Stokes Preconditioners” [poster], Sparse Solvers for Exascale Workshop, March 23-25, 2015, Greifswald, Germany
- Patrick Sanan, Sascha M. Schnepp, Dave A. May, Olaf Schenk, “Exploring Solver Space for Stokes Flow with Highly Heterogeneous Viscosity Structure” [poster], AGU Fall Meeting 2014, December 15-19, San Francisco, California, United States
- Patrick Sanan, “Exploring Solver Space for Stokes Flow with Highly Heterogeneous Viscosity Structure” [poster], International Symposium on Post-Petascale System Software (ISP2S2), December 2-4, 2014, Kobe, Japan
- Patrick Sanan, “Geometric Elasticity for Graphics, Simulation, and Computation” [thesis], 2013 [\[text online\]](#)
- Patrick Sanan, “Geometric Elasticity with Applications to Surface Parameterization” [poster], Google LAX PhD Summit 2013 (best poster)
- Patrick Sanan and Nathan Litke, “Bounded-distortion Surface Parameterization with Seam Constraints”, 2013 [preprint]
- Patrick Sanan and Peter Schröder, “Logarithmic Strain Measures for Elasticity Simulation and Geometry Processing”, 2012 [preprint]
- Patrick Sanan, “Sound Synthesis with Nonlinear Elastodynamics and Fully Variational Integrators” [poster], International Computer Music Conference 2011 .
- Isaac Chao, Ulrich Pinkall, Patrick Sanan, and Peter Schröder, “A Simple Geometric Model For Elastic Deformation”, ACM Transactions on Graphics (TOG) [\[text online\]](#) Volume 29 , Issue 4 (July 2010). Proceedings of ACM SIGGRAPH 2010.
- Wang-Juh Chen, Hoi Tin Kong, Minah Oh, Patrick Sanan, Ying Wang and Brendt Wohlberg. “Visual Words: Text Analysis Concepts for Computer Vision” [Preprint; Part of a week-long 2009 IMA team workshop].

## Selected Talks and Presentations

- “Pipelined, Flexible Krylov Subspace Methods and Accelerated Subdomain Smoothing: Attacks on aggressive nested preconditioners for challenging geophysical Stokes flow problems” [minisymposium talk], SIAM Conference on Applied Linear Algebra, Atlanta, Georgia, USA, October 26-30, 2015.
- “Towards Aggressive, Accelerated Multigrid Smoothing” [invited talk], ASE Seminar, University of Tokyo, Tokyo, Japan, October 16, 2015.

- “Pipelined, Flexible Krylov Subspace Methods”[invited talk], IWACOM-III, Tokyo, Japan, October 12-14, 2015.
- “Using Julia on a Cray Supercomputer”[lightning talk], Juliacon 2015, MIT, Boston, Massachusetts, USA, June 24-27, 2015.

## Audiovisual Installations

- 2010 - Pondlife III (S.LOW Projekt, Berlin. With Sam Salem) [\[video online\]](#)
- 2009 - Pondlife II (NYCEMF II, New York. With Sam Salem)
- 2009 - Pondlife II (International Computer Music Conference, Montreal. With Sam Salem)
- 2008 - IDEAL (LICA) [\[video online\]](#)
- 2008 - Pondlife (SAN Expo, Plymouth, England. With Sam Salem)

## Honors

2007-2008 Kaplun Graduate Fellowship, Caltech ACM [One year graduate fellowship]

2006-2007 Tony Thornley Scholarship [One year full Master’s scholarship]

2006 Highest Academic Achievement Award in Aerospace Engineering, UCSD

2006 John E. Starlett Memorial Scholarship Award, UCSD

Tau Beta Pi, Phi Beta Kappa

2005 Deans Award for Excellence, UCSD : Mathematics

Jacobs Engineering Scholar, Jacobs School of Engineering, UCSD [4-year full scholarship]

Regents Scholar, UCSD

## Computer Skills

**Programming Languages:** C, C++, Python, OpenCL

**High-level Mathematical Environments:** Mathematica, MATLAB, Julia

**Scientific Computing :** PETSc

**HPC Systems:** Cray

**Animation/FX Software :** Houdini

**Other:** git, Unix/Linux, Mac OS X, L<sup>A</sup>T<sub>E</sub>X

## Teaching Experience

Fall 2015 : **Instructor**

Software Engineering For Computational Science, USI [\[materials online\]](#)

August 30, 2015 : **Instructor**, HPC Libraries

CSCS Summer School 2015 [\[materials online\]](#)

Spring 2013 : **Instructor**

ACM 11: Introduction to Mathematica and MATLAB, Caltech. [\[materials online\]](#)

Fall-Spring 2008-2013 : **Teaching Assistant**

Applied and Computational Mathematics, Caltech

- ACM106abc: Numerical Analysis
- ACM101abc: Methods of Applied Mathematics
- ACM95/100abc: Introductory Methods of Applied Mathematics
- ACM118: Methods in Applied Statistics and Data Analysis
- ACM 11: Introduction to Mathematica and MATLAB

Fall 2004 : **Tutor**

MAE 3: Introduction to Design and Graphics, UCSD

## Employment

Summer 2015-Present : **Postdoctoral Researcher**

[PASC GeoPC Co-Design Project](#)

Università della Svizzera italiana (USI), Lugano, Switzerland

Advisors: Olaf Schenk (USI), Dave A. May (ETH Zürich)

Summer 2013 : **Givens Scholar** (Detached Study)

[MCS Division, Argonne National Laboratory](#), Lemont, IL, United States

Supervisor: Jed Brown

Summer 2012 : **Software Engineering Intern** (Detached Study)

[Rhythm and Hues Studios](#), El Segundo, CA, United States

Fall-Spring 2008-2013 : **Teaching Assistant and Instructor**

Applied and Computational Mathematics, Caltech

Summer 2005 : **Grader**

MAE 101B: Advanced Fluid Dynamics, UCSD

Fall 2004 : **Tutor**

MAE 3: Introduction to Design and Graphics, UCSD

Summer 2004 : **Mechanical Engineering Intern**

General Atomics Lynx Systems, San Diego, CA, United States

Part time 2000-2001 : **Sales Clerk**

Longs Drugs, Walnut Creek, CA, United States