Patrick Sanan
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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 [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) [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

- "Using Julia on a Cray Supercomputer"[lightning talk], Juliacon 2015, MIT, Boston, Massachusetts, USA, June 24-27, 2015.
- "Pipelined, Flexible Krylov Subspace Methods"[invited talk], IWACOM-III, Tokyo, Japan, October 12-14, 2015.
- "Towards Aggressive, Accelerated Multigrid Smoothing"[invited talk], ASE Seminar, University of Tokyo, Tokyo, Japan, October 16, 2015.

- "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.

Audiovisual Installations

- 2010 - Pondlife III (S.LOW Projekt, Berlin. With Sam Salem) video
- 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
- 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, LaTeX

Employment and Teaching

Fall 2015 : **Instructor**
Software Engineering For Computational Science, USI

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

Spring 2013 : **Instructor**
ACM 11: Introduction to Mathematica and MATLAB, Caltech.

Summer 2012 : **Software Engineering Intern** (Detached Study)
Rhythm and Hues Studios, El Segundo, CA, United States

Fall-Spring 2008-2013 : **Teaching Assistant**
Caltech Applied and Computational Mathematics

- 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

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