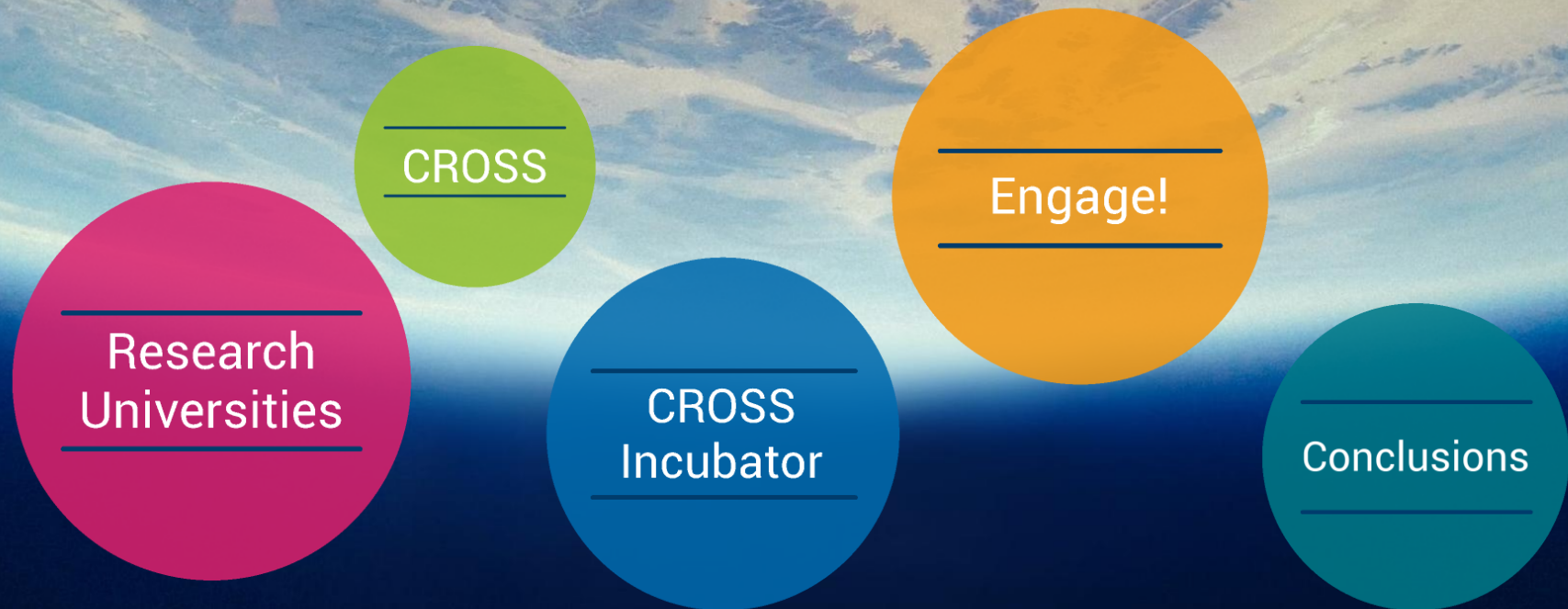


# How to Leverage Research Universities

Carlos Maltzahn  
Center for Research in  
Open Source Software  
UC Santa Cruz



# Research Universities

Students

Papers

Software?





# Students

---

Most get a job in industry after  
their degree



Undergrad  
& Masters

PhD

# Undergrad & Master students

---

Go for grades and experience



# PhD students

Go for **publications** & experience





# Research publications

Research results for engineers  
(and VCs)



# What about Software?

PhDs in Science & Engineering in the US:

2017: 54,664

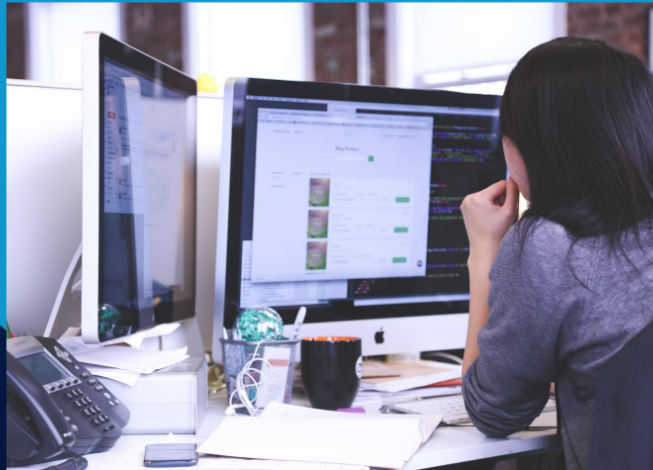
2016: 54,862

2015: 54,901

...

[NCSES]

Likely that some of them created significant research prototype software



Software  
Prototypes

PhDs  
Turned  
OSS  
Leaders

Research  
Delivery

# Research Prototype Software Life Cycle

PhD students build amazing research prototype software

Available as OSS as part of publications

Software is left behind when students graduate





Available as OSS as part of publications

Software is left behind when students graduate



Available as OSS as part of publications

Software is left behind when students graduate

Unless PhD students become OSS leaders





# PhD students turned OSS Leaders

Sage Weil (Ceph) - UC Santa Cruz



Matei Zaharia (Spark) - UC Berkeley



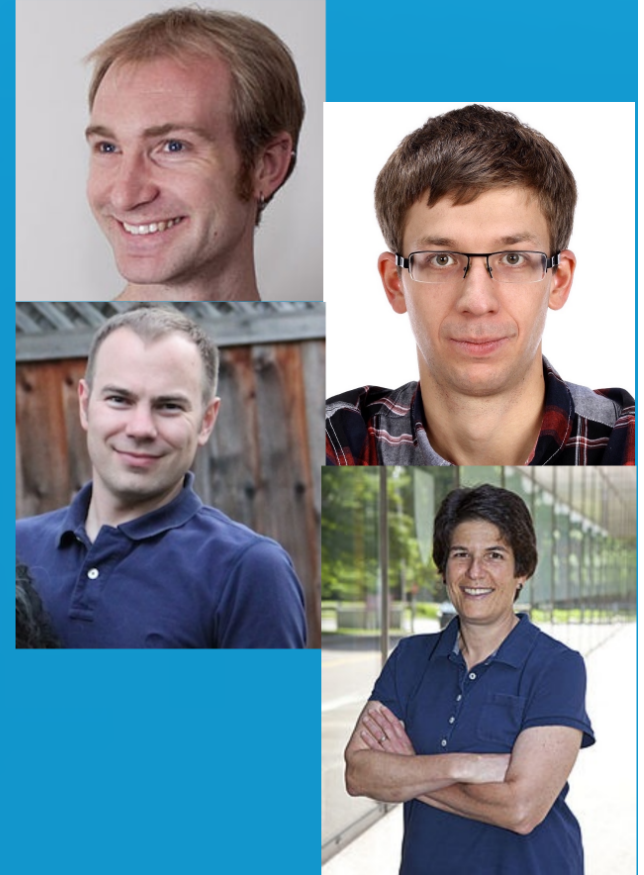
Chris Lattner (LLVM, Clang) - UIUC



Margo Seltzer (Berkeley DB) - UC Berkeley



...





# Efficient Research Delivery

Implement efficient delivery of software = efficient delivery of research

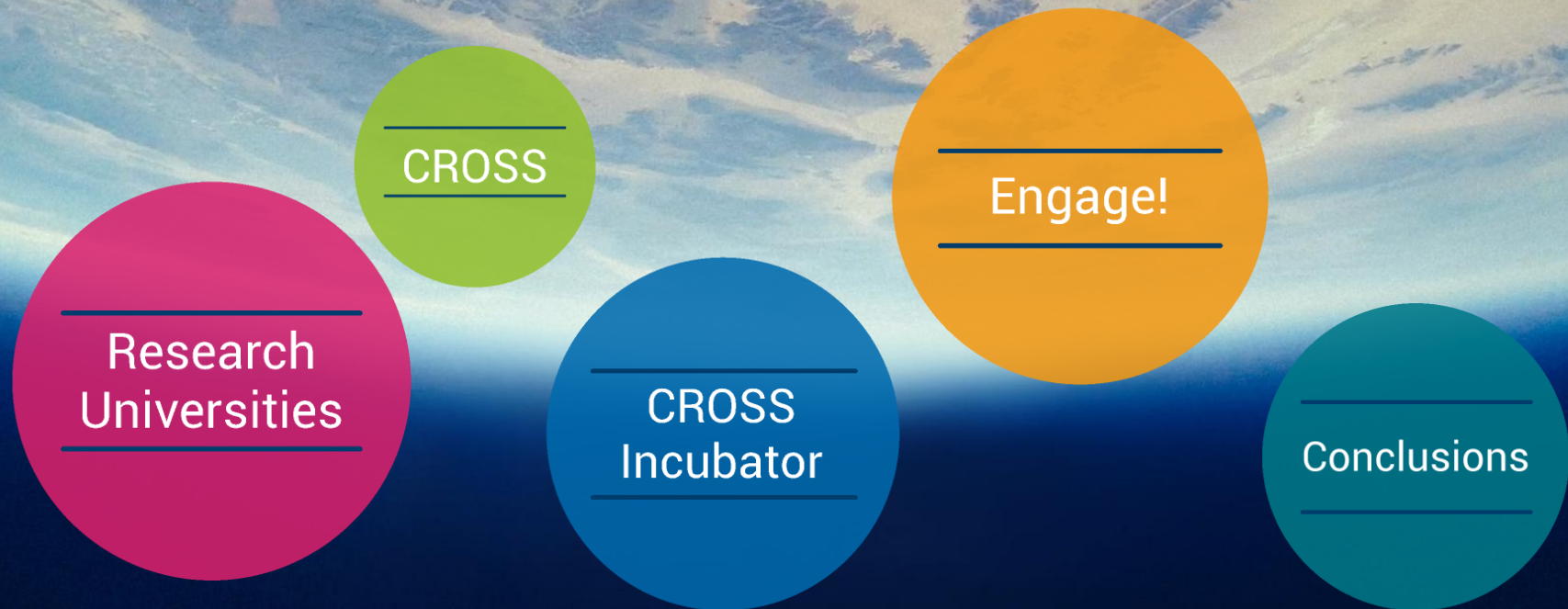
Create and shape new markets

Create significant value and attract network of talent



# How to Leverage Research Universities

Carlos Maltzahn  
Center for Research in  
Open Source Software  
UC Santa Cruz



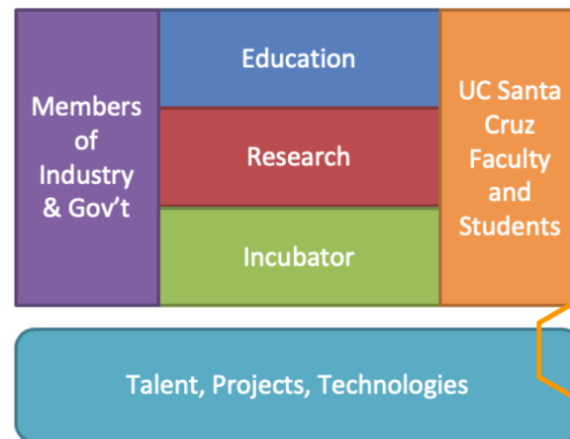




CENTER FOR RESEARCH IN  
OPEN SOURCE SOFTWARE

- **Bridges gap between student research & open source projects**
- Funded by Sage Weil endowment & corporate memberships

- Educate the next generation of OSS leadership
- Leverage OSS culture in university research
- Incubate work beyond graduation to reach critical mass



Governance

Portfolio &  
Operations





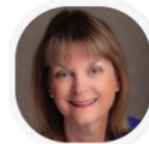
# Governance



Stephanie Lieggi,  
Assistant Director



Carlos Maltzahn,  
Director



Lavinia Preston,  
Admin Assistant

## Industry Advisory Board

**TOSHIBA**



**Western Digital.**



**SAMSUNG**

## Advisory Committee



**Doug Cutting** (Chief Architect, Cloudera)  
Founder of numerous groundbreaking open-source projects, including Lucene, Nutch, Avro, Hadoop



**Karen Sandler** (Executive Director, Software Freedom Conservancy)  
Former executive director of GNOME Foundation, former general counsel of Software Freedom Law Center



**Sage Weil** (Chief Architect of Ceph, Red Hat)  
Creator of WebRing, founder of DreamHost, founder and CTO of Inktank, recipient of O'Reilly Open Source Award



**James Davis** (Professor of Computer Science and Engineering)  
He was Founding Director of UCSC Center for Entrepreneurship, sits on advisory councils for startups and nonprofits. Interested in research applying technology to address global social issues, and has developed an award winning course around this theme.

# Advisory Committee



**Doug Cutting** (Chief Architect, Cloudera)

Founder of numerous groundbreaking open-source projects, including Lucene, [Nutch](#), Avro, Hadoop



**Karen Sandler** (Executive Director, Software Freedom Conservancy)

Former executive director of GNOME Foundation, former general counsel of Software Freedom Law Center



**Sage Weil** (Chief Architect of [Ceph](#), Red Hat)

Creator of [WebRing](#), founder of [DreamHost](#), founder and CTO of [Inktank](#), recipient of O'Reilly Open Source Award



**James Davis** (Professor of Computer Science and Engineering)

He was Founding Director of UCSC Center for Entrepreneurship, sits on advisory councils for startups and nonprofits. Interested in research applying technology to address global social issues, and has developed an award winning course around this theme.

# Current Fellowships

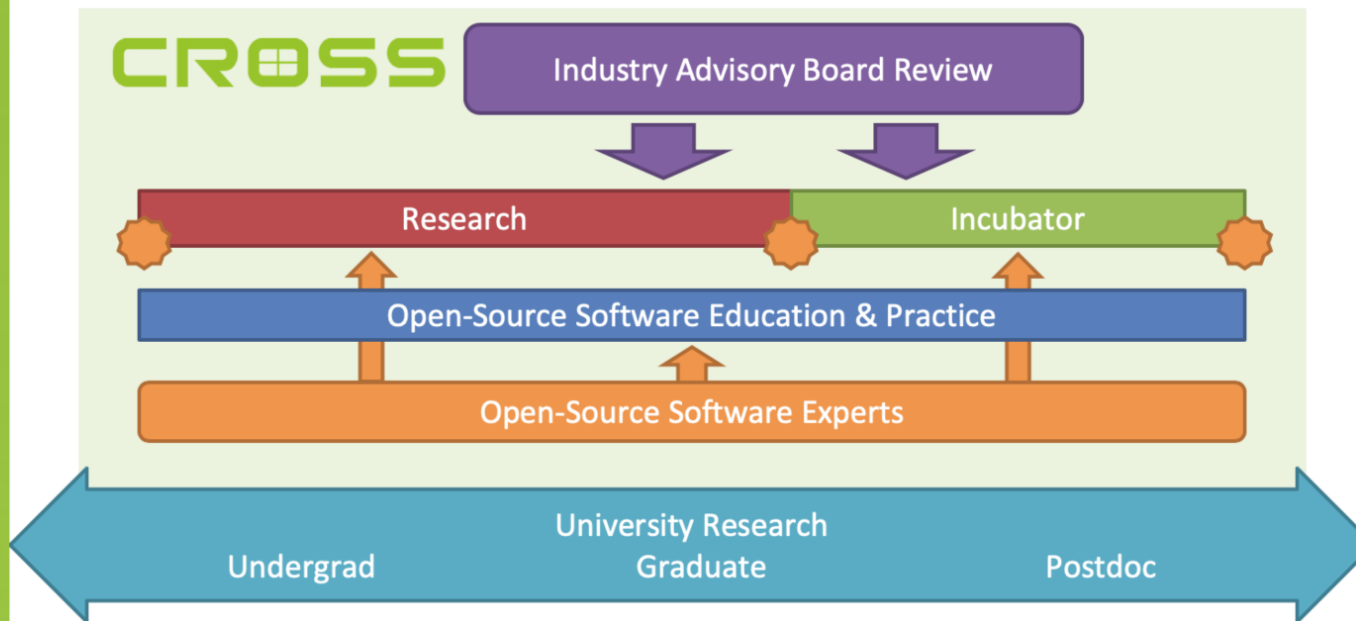
**3 Research Fellows** (see [cross.ucsc.edu](http://cross.ucsc.edu)) and **3 Incubator Fellows** (see below)





# CROSS Operations

- Modelled after NSF's I/UCRCs
- Adds open-source software focus
- Sustained through membership fees



ry Board Review



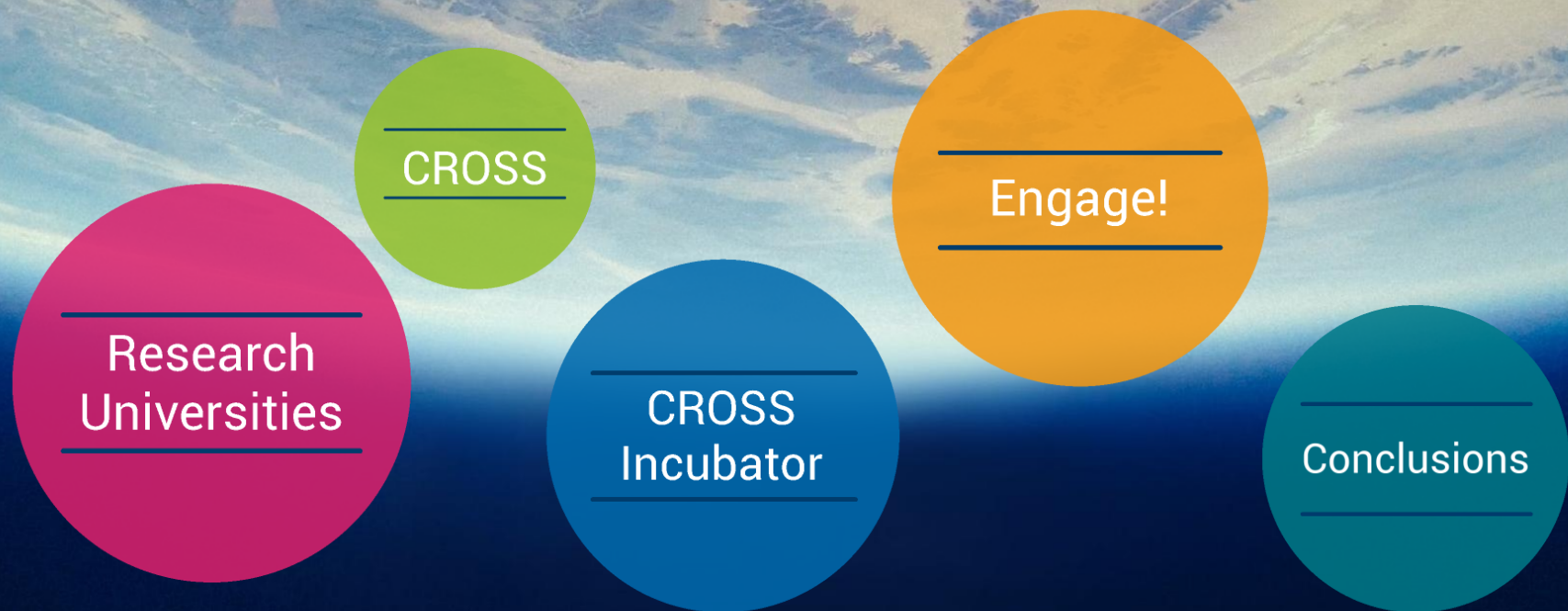
Incubator



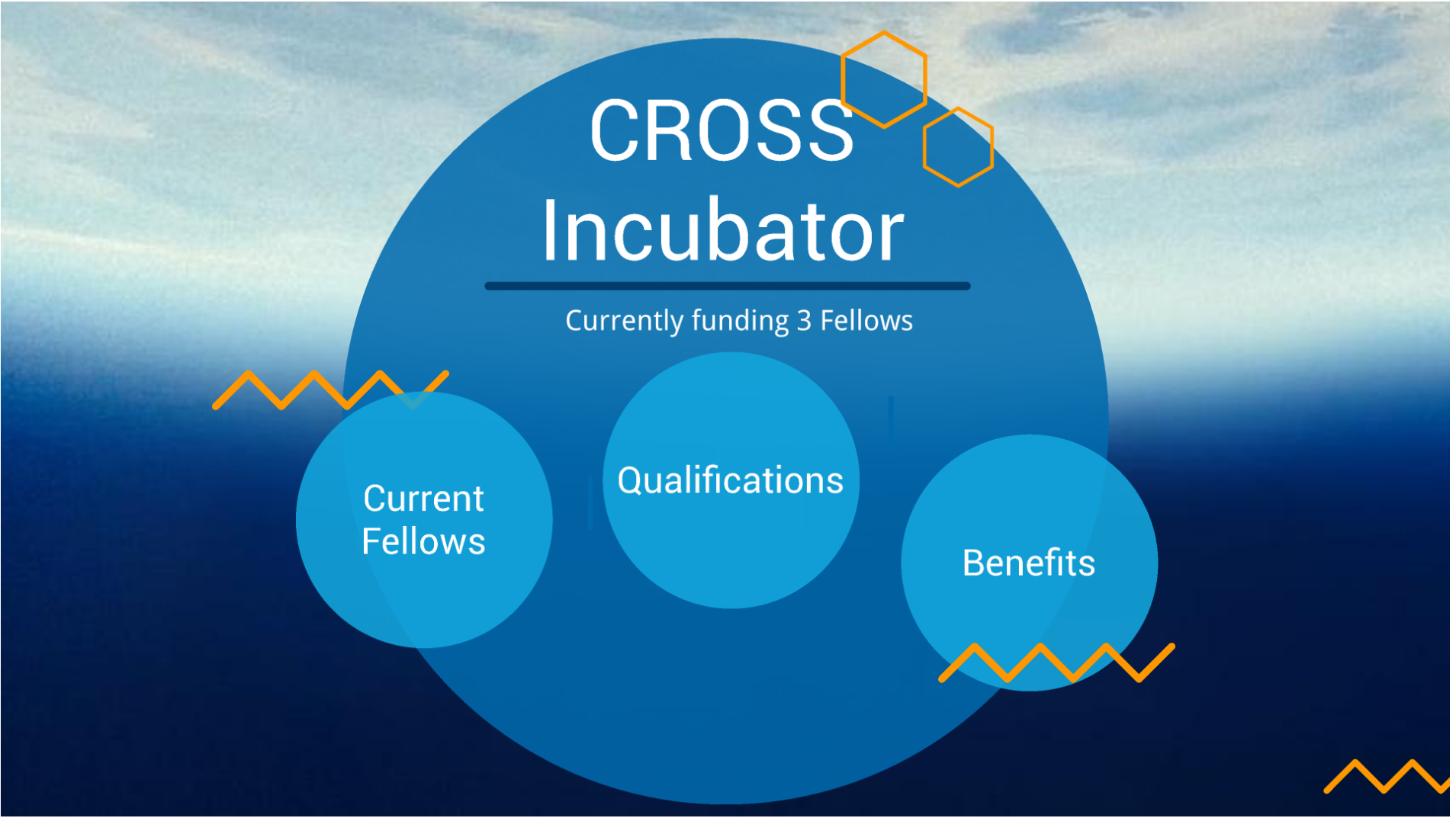
Education & Practice

# How to Leverage Research Universities

Carlos Maltzahn  
Center for Research in  
Open Source Software  
UC Santa Cruz







# CROSS Incubator

Currently funding 3 Fellows

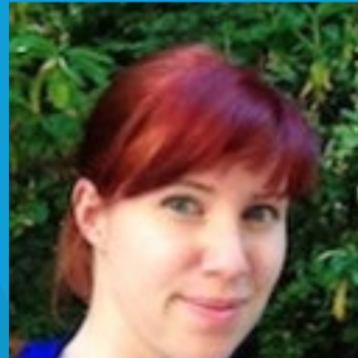
Current  
Fellows

Qualifications

Benefits

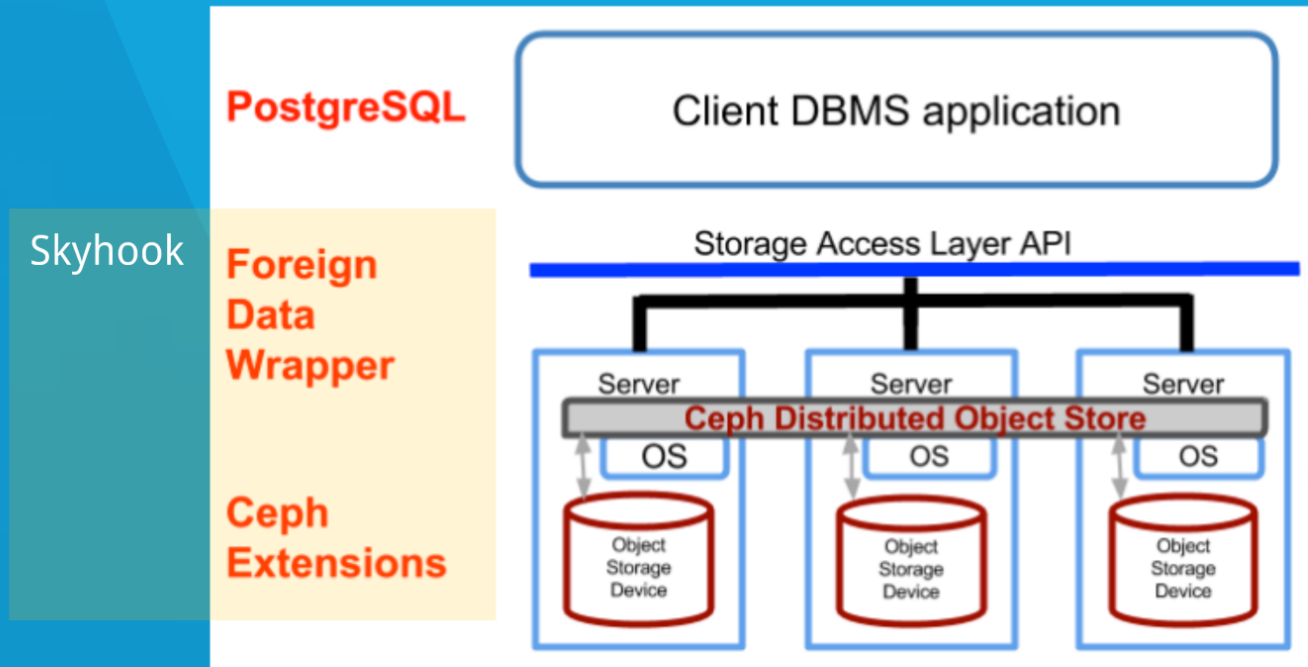
## Current Fellows

Currently funding 3 Fellows:  
Jeff LeFevre, Kate Compton, Ivo Jimenez



# Jeff LeFevre: Skyhook

Programmable Storage for Databases



<https://users.soe.ucsc.edu/~jlefevre/>



# Kate Compton: Tracery 2 & Chancery

Tracery but with finite state machines instead of grammars.



## Tracery: generate text, graphics and more

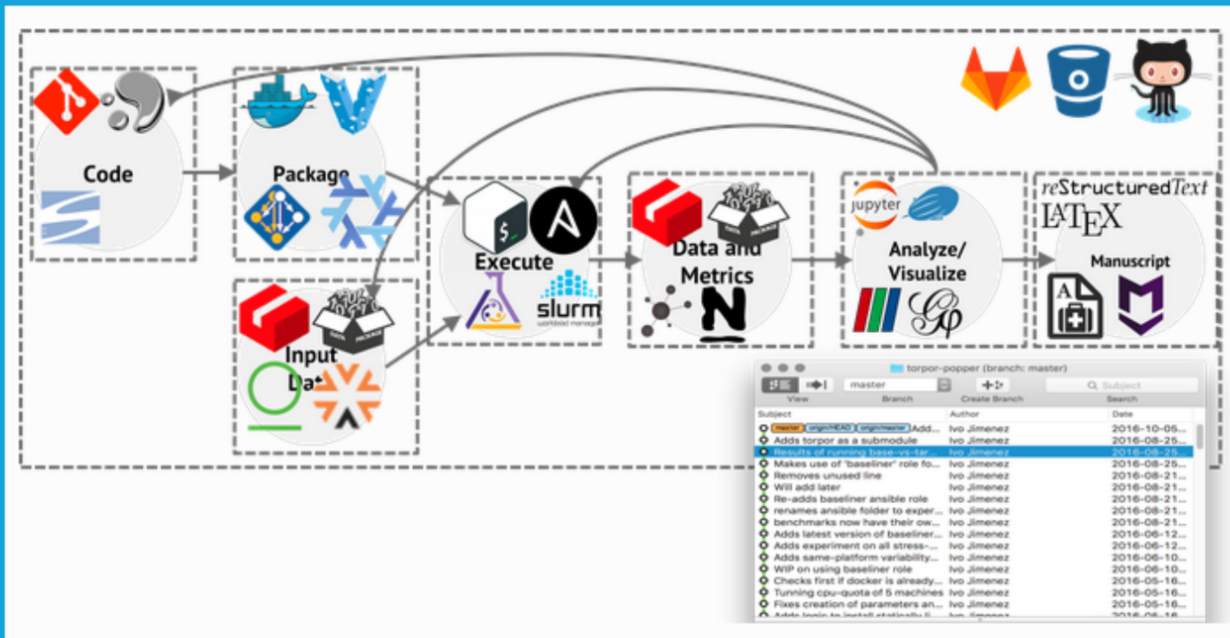
Tracery is a super-simple tool and language to generate text, by [GalaxyKate](https://www.galaxykate.com/). It's been used by middle school students, humanities professors, indie game developers, professional bot makers, and lots of regular people, too. Give it a try today!

[GET THE REPO](#)[TRY AN ONLINE TUTORIAL](#)[JUMP INTO THE EDITOR](#)[MAKE A TWITTERBOT](#)[DOWNLOAD AND PRINT A HELPFUL ZINE](#)[READ AN ACADEMIC PAPER](#)

<https://www.galaxykate.com/>

# Ivo Jimenez: Black Swan

The Practical Reproducibility Platform



<https://users.soe.ucsc.edu/~ivo/>

# Incubator Fellow Qualifications

Graduated with a Ph.D. and is a well-published expert

Starts out with a significant code base from the Ph.D. project

Leverages at least one well-established OSS community

Wants to become an OSS leader





# Benefits

Postdoc position with salary + benefits

Regular review by Advisory Committee and Industry Advisory Board

**Community seeding** via "Research Experience" Programs

Tap into pool of students who need projects to work on

CROSS is Google Summer of Code Mentor Organization

Great community management training

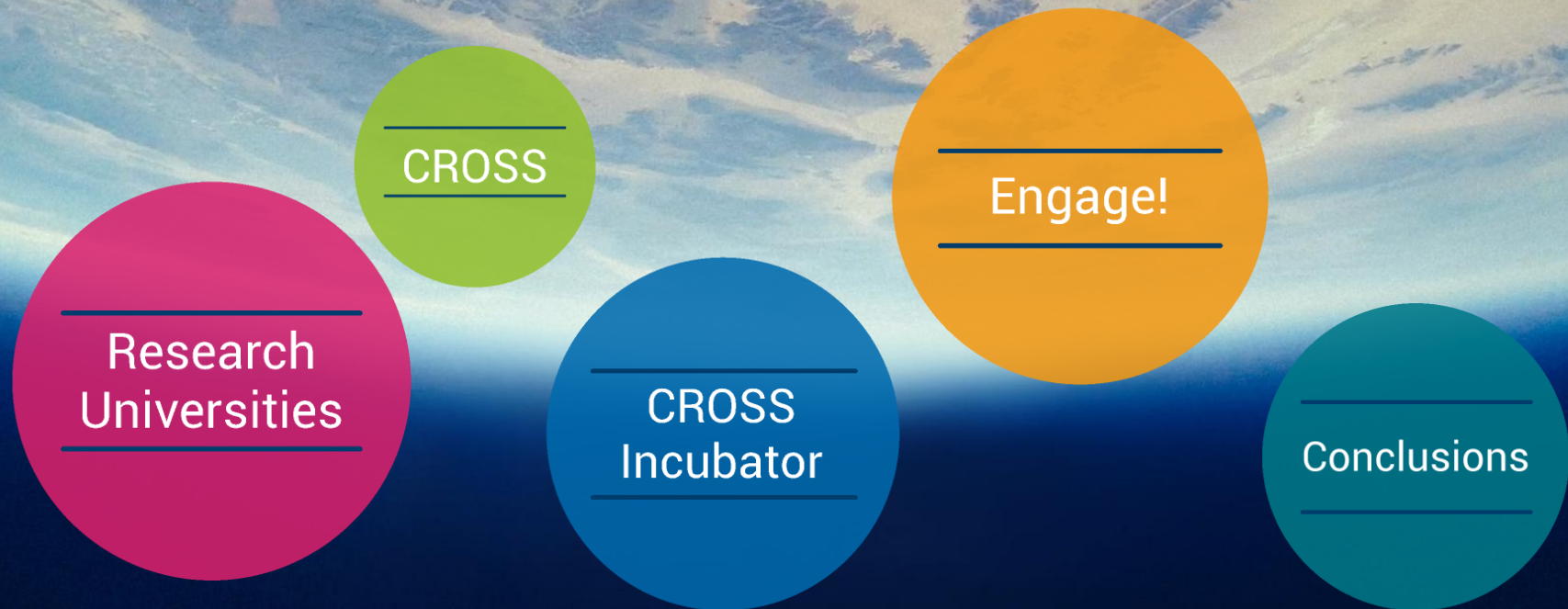
Great driver for community infrastructure



Google  
Summer of Code

# How to Leverage Research Universities

Carlos Maltzahn  
Center for Research in  
Open Source Software  
UC Santa Cruz



# Engage!

Join university research centers like CROSS

Membership fees encourage OSS strategies & techniques in research and tech transfer

IAB meetings are twice a year (mid March and beginning of October)

Join & contribute to OSS incubator projects (no membership needed)

Participate in 2-day CROSS Research Symposium (next is October 2-3)

Shows off student work at CROSS and other UC Santa Cruz programs





# October 24-25, 2016

Monday, October 24 in the Simulanium, E2-180	
8:15-8:45	Registration and Continental Breakfast, Lower Engineering Courtyard
8:45-9:00	Welcome
9:00-9:30	<a href="#">Keynote Address: Josh Stuart (UCSC)</a> Professor of Biomolecular Engineering, Associate Director of CBSE for Cancer and Stem Cell Genomics, Baskin Endowed Chair
9:30-10:00	Presentation Preview Spotlights and Introduction to Workshops
10:00-10:30	BREAK – Refreshments and Discussion, Lower Engineering Courtyard
WORKSHOPS	
10:30-12:00 Session I	<a href="#">Secure, Real-time Sharing of Cancer Gene Information</a> Chair: Rob Currie, CTO, Genomics Institute Simulanium, E2-180
	<a href="#">Data-Driven Dynamic Networked Systems</a> Chair: Ricardo Sanfelice Engineering 2, 5THFloor, Room 599
	<ul style="list-style-type: none"> <li>- The Cancer Gene Trust (Rob Currie)</li> <li>- ADAM (Frank A. Nothaft)</li> <li>- Models, Algorithms, and Evaluation for Autonomous Mobility-On-Demand Systems (Marco Pavone)</li> <li>- Challenges of Implementing Incentive Mechanisms for Reducing Infrastructure Congestion (John Mussachio)</li> <li>- Towards the Internets of the Future (Katia Obraczka)</li> </ul>
12:00-1:30	LUNCH –Catered by Falafel of Santa Cruz
1:30-3:00 Session II	<ul style="list-style-type: none"> <li>- Toil (Hannes Schmidt)</li> <li>- UCSC Genomics Core Architecture (Brian O'Connor)</li> <li>- Smart Storage in Genomics (Carlos Maltzahn)</li> <li>- From Distributed Robotics to Cloud Robotics (Stefano Carpin)</li> <li>- Scalable Collective Reasoning over Network Data (Lise Getoor)</li> </ul>
3:00-4:00	BREAK & Poster Session – Refreshments and Discussion, Lower Engineering Courtyard
4:00-5:00	<a href="#">Keynote Address: David Haussler (UCSC)</a> Investigator at Howard Hughes Medical Institute, Distinguished Professor of Biomolecular Engineering, Scientific Director of UC Santa Cruz Genomics Institute, Director of Cancer Genomics Hub, Scientific Co-Director of California Institute for Quantitative Biosciences (QB3)
5:00-8:00	Oktoberfest Dinner – Lower Engineering Courtyard

Tuesday, October 25 in the Simulanium, E2-180	
8:15-8:45	Registration and Continental Breakfast, Lower Engineering Courtyard
8:45-9:00	Welcome
9:00-9:30	<a href="#">Keynote Address: Karen Sandler</a> Executive Director of Software Freedom Conservancy
9:30-10:00	Presentation Preview Spotlights and Introduction to Workshops
10:00-10:30	BREAK – Refreshments and Discussion, Lower Engineering Courtyard
WORKSHOPS	
10:30-12:00 Session I	<a href="#">Programmability and Architecture of Storage Systems</a> Chairs: Carlos Maltzahn, Jishen Zhao Simulanium, E2-180
	<a href="#">Towards a Better Computer Arithmetic: A unum (Universal Number) Workshop</a> Chairs: Nic Brummell, John Gustafson Engineering 2, 5THFloor, Room 599
	<ul style="list-style-type: none"> <li>- Zlog: distributed shared-log for software-defined storage (Noah Watkins, UCSC)</li> <li>- Mantle: A Programmable Metadata Load Balancer for the Ceph File System (Michael Sevilla, UCSC)</li> <li>- Persistent Memory Workload Characterization: A Hardware Perspective (Bhaskar Jupudi and Xiao Liu, UCSC)</li> <li>- Keynote Address: John Gustafson, Visiting Scientist at A*STAR: "Unum systems for better computational arithmetic"</li> <li>- General discussion of unums</li> </ul>
12:00-1:30	LUNCH –catered by Scopazzi's
1:30-3:00 Session II	<ul style="list-style-type: none"> <li>- Keynote Address: Pankaj Mehra, VP &amp; Senior Fellow, SanDisk / Western Digital: "Evolutionary developments, revolutionary implications: persistent memory in the data center"</li> <li>- Complexity-effective architecture solutions for persistent memory systems (Matheus Ogleari, UCSC)</li> <li>- Measurements For A Tailored Number System (Andrew Shewmaker, LANL)</li> <li>- Unum implementation in Julia (Isaac Yonemoto, A*STAR)</li> </ul>
3:00-3:30	BREAK – Refreshments and Discussion, Lower Engineering Courtyard
3:30-5:00 Session III	<ul style="list-style-type: none"> <li>- Elastic Databases for the Cloud (Jeff LeFevre, UCSC)</li> <li>- Inigo: Ambidextrous Congestion Control in Data Centers (Andrew Shewmaker, LANL)</li> <li>- The Popper Convention: Making Reproducible Systems Evaluation Practical (Ivo Jimenez, UCSC)</li> <li>- LULESH execution with Unums in C/C++ (Scott Lloyd, LLNL)</li> <li>- Progress report of the CROSS Unum project (Andrew Klofas, UCSC)</li> </ul>

# October 3-4, 2017

Wednesday, October 4		
8:00-8:45	Registration and Continental Breakfast, Lower Engineering Courtyard	
	PLENARY - Simulium, E2-180	
8:45-9:00	Welcome by Alexander Wolf, Dean, Baskin School of Engineering and by Carlos Maltzahn, CROSS Director	
9:00-10:00	Panel: <a href="#">Open-source software in practice from the industry perspective</a> Chair: Doug Cutting (Cloudera) Panelists: Michell Casbon (Qordoba), Tushar Shanbhag (LinkedIn), Raymie Stata (Altilscale), Carlos Maltzahn (UCSC)	
10:00-10:30	Presentation Preview Spotlights and Introduction to Workshops (Chair: Stephanie Lieggi)	
10:30-10:50	BREAK – Refreshments and Discussion, Lower Engineering Courtyard	
	WORKSHOPS	
	<a href="#">Computational Genomics</a>	<a href="#">Security in Network Systems</a>
	Chair: Rob Currie, CTO, Genomics Institute Simulium, E2-180	Chair: Ricardo Sanfelice Engineering 2, 5th Floor, Room 599
10:50-12:00 Session I	- Toiling Away in Bioinformatics: Toil and Data Workflows in Bioinformatics (Lon Blauvelt, Jesse Brennan) - CapNet: Security and Least Authority in a Capability-Enabled Cloud (Anton Burtsev) - The Importance of Interpretability in Cyber Security Analytics (Justin Moore) - A Control-Theoretic and Data-Driven Approach to Securing Cyber-Physical Systems and Networks (Fabio Pasqualetti)	
12:00-1:00	LUNCH – Lower Engineering Courtyard (Catered by Falafel of Santa Cruz)	
	PLENARY - Simulium, E2-180	
1:00-1:45	Keynote: Nithya Ruff - <a href="#">How Companies are Engaged in Open Source</a> Senior Director, Open Source Practice, Comcast	
	WORKSHOPS	
	<a href="#">Reproducibility</a>	<a href="#">Network Systems Applications</a>
	Chair: Ivo Jimenez (UCSC) Simulium, E2-180	Chair: Ricardo Sanfelice Engineering 2, 5th Floor, Room 599
1:50-3:10 Session II	- Reproducibility Challenges and Opportunities in Computational Science (Carl Boettiger) - BugSwarm: A Large-Scale Repository of Reproducible Defects, Tests, and Patches (Cindy Rubio Gonzalez)	- Controlling Biology: Towards Optimal Design of Synthetic Networks (Marcella Gomez) - Convex Relaxations for Power System State Estimation (Yu Zhang)
3:10-3:40	BREAK – Refreshments and Discussion, Lower Engineering Courtyard	
	<a href="#">Open Data Management</a>	<a href="#">QSS-based Energy Systems</a>
	Chair: Ivo Jimenez (UCSC) Simulium, E2-180	Chair: Nick Adams Engineering 2, 5th Floor, Room 599
3:40-5:00 Session II	- The Democratization of Data for Infrastructure Management (Selene Arrazolo) - Clinical and Computational Genomics in Open Science (Rob Currie)	- An Intelligent Microgrid Energy Management System powered by SEADS (Ali Adabi) - Solar PV system energy modeling tools and data (Jessica Forbess)
5:10-6:00	Poster Session 1 – Refreshments and Discussion, Lower Engineering Courtyard	
6:00-8:00	OKTOBERFEST Barbeque – Lower Engineering Courtyard	

Thursday, October 5		
8:15-8:45	Registration and Continental Breakfast, Lower Engineering Courtyard	
	PLENARY - Simulium, E2-180	
8:45-9:00	Welcome by Carlos Maltzahn, CROSS Director	
9:00-9:30	Keynote: Allen Samuels - <a href="#">The Consequences of Infinite Storage Bandwidth</a> Engineering Fellow, Western Digital Corporation	
9:30-10:00	Presentation Preview Spotlights and Introduction to Workshops (Chair: Stephanie Lieggi)	
10:00-10:30	BREAK – Refreshments and Discussion, Lower Engineering Courtyard	
	WORKSHOPS	
	<a href="#">Programmable Storage</a>	<a href="#">Probabilistic Programming Languages</a>
	Chair: Carlos Maltzahn Simulium, E2-180	Chair: Claudia Wehrhahn Engineering 2, 5THFloor, Room 599
10:30-12:00 Session I	- DeclStore: Layering is for the Faint of Heart (Noah Watkins) - Malacology: A programmable storage system (Michael Sevilla) - SkyhookDB: leveraging programmable object storage toward database elasticity in the cloud (Jeff LeFevre)	- Flexible programming of hierarchical modeling algorithms (MCMC and more) and compilation of R using NIMBLE (Christopher Paciorek) - Probabilistic Soft Logic: A Scalable Probabilistic Programming Language for Modeling Richly Structured Domains (Golnoosh Farnadi)
12:00-1:30	LUNCH – Lower Engineering Courtyard (Catered by Scopazzi's) & Poster Session 2	
	<a href="#">Architecture of Storage Systems</a>	<a href="#">Applications of Bayesian Statistical Learning</a>
	Chair: Heiner Litz Simulium, E2-180	Chair: Abel Rodriguez Engineering 2, 5THFloor, Room 599
1:30-2:45 Session II	- Memshare: a Multi-tenant Key-value Cache (Asaf Cidon) - Persistent Memory: Opportunities and Challenges (Niket Agarwal) - Key value SSD: a scalable smart storage for object storage (Yang Seok Ki)	- Distributed Spatial Kriging: Scalable Bayesian Framework for Massive Spatially Indexed Datasets (Rajarshi Guhaniyogi) - A Bayesian Semiparametric Model for a Joint Analysis of Microbiome Data (Juhee Lee)
2:45-3:15	BREAK – Refreshments and Discussion, Lower Engineering Courtyard	
	<a href="#">Architecture of Storage Systems</a>	<a href="#">Unum: Better Computer Arithmetic</a>
	Chair: Yishen Zhao Simulium, E2-180	Chair: John Gustafson Engineering 2, 5THFloor, Room 599
3:15-4:30 Session III	- Write-Optimized DRAM+NVM Hybrid Memory Management (Xiao Liu) - Efficient Hardware-based Undo+Redo Logging for Persistent Memory Systems (Matheus Ogleari)	- Beating Floating Point at its Own Game: Posit Arithmetic (John Gustafson) - Demonstration of the Fused Dot Product in Posit Environments (Isaac Yonemoto)

# Coming up: October 3-4, 2018

## Keynote Speakers:



Cat Allman (Google), AnHai Doan (U Wisc Madison), Jay Kreps (Confluent)

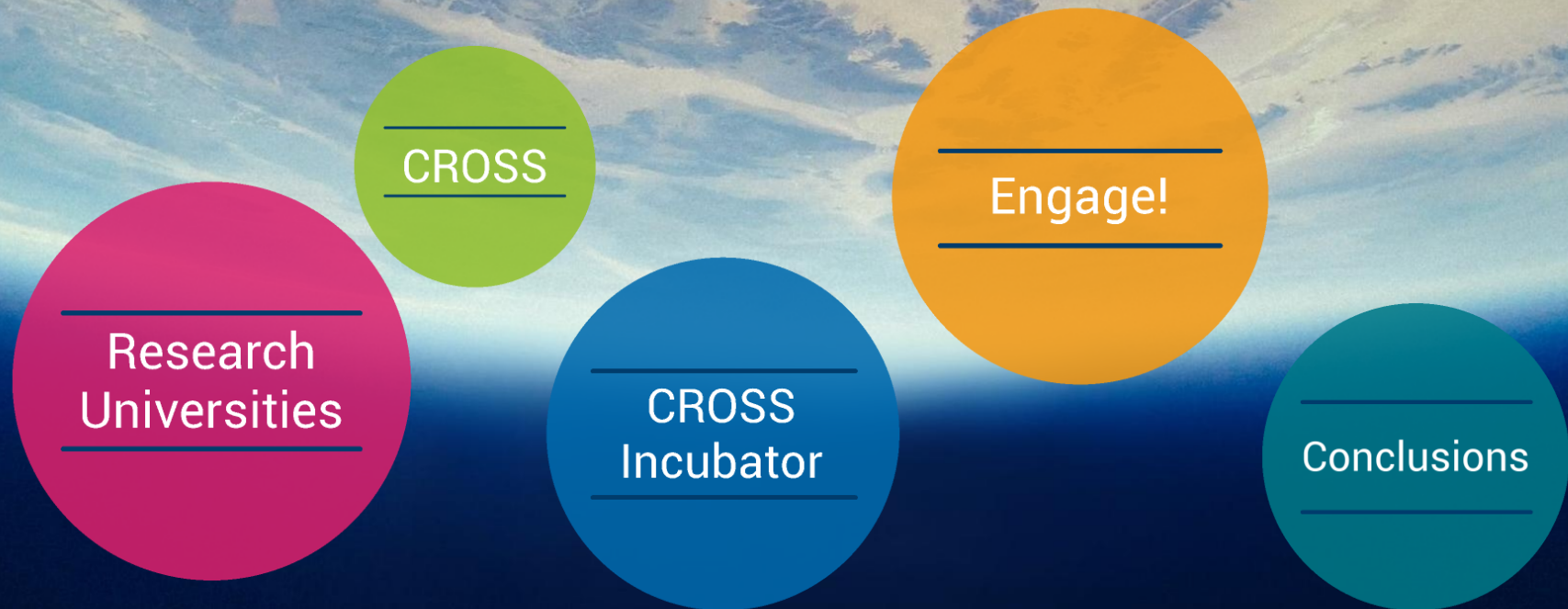
Wednesday, October 3		
8:00-8:45	Registration and Continental Breakfast, Lower Engineering Courtyard	
	PLENARY - Simularium, E2-180	
8:45-9:00	Welcome by Carlos Maltzahn, CROSS Director	
9:00-10:00	<b>Keynote:</b> <b>Developing Open Source Software in Academia for Data Integration: Experience and Lessons Learned</b> AnHai Doan, University of Wisconsin-Madison	
10:00-10:25	Presentation Preview Spotlights and Introduction to Workshops (Chair: Stephanie Lieggi)	
10:25-10:45	BREAK - Refreshments and Discussion, Lower Engineering Courtyard	
	WORKSHOPS	
10:45-12:00 Session I	<b>Data Cleaning</b> Chair: Phokion Kolaitis Simularium, E2-180  Fatma Ozcan (IBM Research), Exploring Knowledge Graphs via Natural Language Interfaces  Frederic Sala (Stanford University), Codes, Embeddings, & Non-Euclidean Geometry: Unexpected Allies in the Fight to Clean Data	<b>Architecture Specification</b> Chair: Jose Renau Engineering 2, 5th Floor, Room 599  Jack Koenig (SiFive), Raising the level of abstraction in digital design with Chisel3 and FIRRTL  Georgios Micheliogiannakis (Lawrence Berkeley NL), Open Hardware: How Open Source Designs Will Drive the Next Generation of HPC Systems  Chris Lavin (Xilinx), RapidWright: Enabling Custom Crafted FPGA Implementations via an Open Source Framework
	12:00-1:00 LUNCH - Lower Engineering Courtyard	
	<b>Keynote:</b> <b>Google Summer of Code: 14 years of trust</b> Cat Allman, Google	
	<b>Data Cleaning</b> Chair: Phokion Kolaitis Simularium, E2-180  Ester Livshits (Technion), Algorithmic Aspects of Least-Effort Database Repairing  Akhil Dixit (UCSC), SAT Solvers - A Promising Approach to Consistent Query Answering	<b>Architecture Specification</b> Chair: Jose Renau Engineering 2, 5th Floor, Room 599  Patrick Lysaght (Xilinx), PYNQ, Python Productivity for Zynq  Rafael Trapani Posignolo (UCSC), Igraph  Panel Discussion: <b>Open Source Hardware Main Challenges</b>
3:10-3:40	BREAK - Refreshments and Discussion, Lower Engineering Courtyard	
3:40-4:55 Session III	<b>Genomics &amp; Privacy</b> Chair: Benedict Paten Simularium, E2-180  Benedict Paten (UCSC), Genomics & Privacy  Russell Corbett-Deleg (UCSC), The Past and Future of Population Genomics  Abhradeep Guha Thakurta (UCSC), Distributed Private Machine Learning  Robert Currie (UCSC), Cross Border Lambdas in Pediatric and Hereditary Cancer	<b>Practical Reproducibility</b> Chair: Ivo Jimenez Engineering 2, 5th Floor, Room 599  Ivo Jimenez (UCSC), Black Swan: The Popper Reproducibility Platform  Rolando Garcia (UC Berkeley), Context: The Missing Piece in the Machine Learning Lifecycle  Chris Holdgraf (Berkeley Institute for Data Science), Open tools and services for practical reproducibility in the cloud
	4:55-5:30 Poster Session - Refreshments and Discussion, Lower Engineering Courtyard	
	5:30-7:30 OKTOBERFEST Barbeque - Lower Engineering Courtyard	

Thursday, October 4		
8:15-9:00	Registration and Continental Breakfast, Lower Engineering Courtyard	
	PLENARY - Simularium, E2-180	
9:00-9:15	Welcome by Carlos Maltzahn, CROSS Director	
9:15-10:00	<b>Keynote:</b> <b>Introduction to Streaming Data and Stream Processing with Apache Kafka</b> Jay Kreps, Confluent	
10:00-10:25	Presentation Preview Spotlights and Introduction to Workshops (Chair: Stephanie Lieggi)	
10:25-10:50	BREAK - Refreshments and Discussion, Lower Engineering Courtyard	
	WORKSHOPS	
10:50-12:15 Session I	<b>Eusocial Storage: Shades of the InStore Compute Spectrum</b> Chair: Philip Kufeldt Simularium, E2-180  Philip Kufeldt (UCSC), Eusocial Storage Intro  Yang Seok Ki (Samsung, InStore Compute: Preset Functions)  Noah Watkins (Red Hat)& Jeff Leve (UCSC), Instore Compute: Interpreted Functions  Scott Shadley (NGD Systems) Instore Compute: General Programming	<b>Bayesian Statistical Learning</b> Chair: Claudia Wehrhahn Engineering 2, 5th Floor, Room 599  Christopher Pacione (UC Berkeley), Probabilistic programming in practice: Using, programming, and sharing hierarchical modeling algorithms such as MCMC and Sequential Monte Carlo using NIMBLE  Claudia Wehrhahn (UCSC), Variable selection for assessing red wine quality: a NIMBLE solution
	12:15-1:30 LUNCH - Lower Engineering Courtyard	
	<b>Storage Systems</b> Chair: Carlos Maltzahn Simularium, E2-180  Noah Watkins (Red Hat), Programmable Storage  Michael Sevilla (TidalScale), Scalable Global Namespaces  Yiming Zhang (UCSC), Study of QoS in Ceph	<b>Smart Power and Cyber-physical Systems</b> Chair: Yu Zhang Engineering 2, 5th Floor, Room 599  Ming Jin (UC Berkeley), Stability-certified Smooth Reinforcement Learning: A Control-theoretic Perspective  Yihsu Chen (UCSC), A Power Market Model in Presence of Strategic Prosumers  Ram Rajagopal (Stanford), Online Learning and Optimization in Distributed Energy System
	2:45-3:15 BREAK - Refreshments and Discussion, Lower Engineering Courtyard	
	<b>Storage Systems</b> Chair: Carlos Maltzahn Simularium, E2-180  Timothy Feldman (Seagate), The Edge of Storage  Reza NasiriGardeh (UCSC), Exploring expressive data access policies in data-intensive science domains  Jeff LeFevre (UCSC), Skyhook: leveraging programmable object storage toward database elasticity	<b>Smart Power and Cyber-physical Systems</b> Chair: Yu Zhang Engineering 2, 5th Floor, Room 599  Ruojia Xi (UC Berkeley), Privacy Preservation in Cyber-Physical Systems  Afif Maqsood (UCSC), Optimal Rotational Load Shedding via Bilinear Integer Programming  Hongcai Zhang (UC Berkeley), Data-driven Approach to Harnessing Flexibility of Large-scale Distributed Energy Resources for Power Grids
3:15-4:30 Session III		



# How to Leverage Research Universities

Carlos Maltzahn  
Center for Research in  
Open Source Software  
UC Santa Cruz



# Conclusions

Traditionally research universities produced students and papers

Now there is a 3rd "product": OSS leadership

CROSS is creating structures which enable PhD students to turn into OSS leaders

Universities with their large student pool spanning undergraduate and graduate programs are ideal starting points for creating communities

**Contact:** [cross-info@ucsc.edu](mailto:cross-info@ucsc.edu), **web:** [cross.ucsc.edu](http://cross.ucsc.edu), **youtube:** [bit.ly/uccross](http://bit.ly/uccross)



CENTER FOR RESEARCH IN  
OPEN SOURCE SOFTWARE

# How to Leverage Research Universities

Carlos Maltzahn  
Center for Research in  
Open Source Software  
UC Santa Cruz

