

FACULTY newsletter

CPMS Physical and Mathematical Sciences

Nobel laureate and distinguished geneticist to speak in Provo



Above: Dr. Mario Capecchi.

Over his nearly 50-year career in genetics and cancer research, Dr. Mario Capecchi of the University of Utah School of Medicine has won numerous awards including the 2007 Nobel Prize in Physiology or Medicine and the National Medal of Science. Dr. Capecchi will be presenting the Reed M. Izatt and James J. Christensen Lectures on January 24, at Brigham Young University. His technical lecture titled, "Gene Targeting into the 21st Century: Mouse Models of Human Disease from Cancer to Neuro-Psychological Disorders," will be held at 2 p.m. in room W112 of the Benson Building. All faculty and students are invited. The general lecture for faculty, students and all interested members of the community titled, "The Making of a Scientist: An Unlikely Jour-

ney," will be held at 4 p.m. in the Joseph Smith Building auditorium.

Dr. Capecchi was born in Verona, Italy in 1937. After his mother was arrested and sent to the Dachau concentration camp during World War II, he lived on the streets for the next four years until they were reunited as he lay dying of malnutrition in a hospital. After moving to the United States, Dr. Capecchi began school for the first time at age nine. In spite of his difficult childhood, he graduated from Antioch College in 1961 and received his PhD in biophysics from Harvard University in 1967 under the tutelage of Dr. James Watson, co-discoverer of the structure of DNA and another Nobel laureate.

Dr. Capecchi taught at Harvard Medical School until 1973 when he

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CPMS Three Minute Thesis (3MT) Competition: Graduate Research in a Nutshell



Three minutes is not a lot of time. In three minutes you can't even watch a decent YouTube video or cook a box of mac and cheese.

So would it be possible to explain a doctoral thesis in three minutes? That is what the University of Queensland, Australia, has encouraged by creating the program 3MT.

3MT, meaning "Three Minute Thesis," challenges students working on a graduate degree to present their thesis in just three minutes. And to make matters more interesting, the students must explain it using language that a non-specialist audience will understand.

This competition encourages young researchers to develop the skill of explaining condensed versions of com-

plex data and research. Ryan Stafford, 3MT's 2011 People's Choice awardee, said, "If early career researchers do not possess the skills to present their research in a clear and engaging way, our message and the implications of our research could be lost."

Now 3MT is coming to BYU. Each college on campus will hold a preliminary competition. Two students from each college will then advance to the university-wide final round, which will be held on February 26, 2014. The first place winner will receive \$5,000; second place will receive \$2,500; third place will receive \$1,000; and the people's choice will win \$1,000.

Current CPMS students who are pursuing an MS or PhD degree may ap-

ply to present a condensed version of their research to a live audience and a panel of judges at noon on January 31, 2014, in the Hinckley Center's 3rd floor commons. The two winners of this CPMS college competition will each be awarded \$600. Additionally, six honorary mentions will each receive \$50. Pizza will then be served to all those who attend.

The judges will critique how well participants do the following: explain their research, spark the audience's desire to know more, and communicate in language "appropriate to an intelligent but non-specialist audience."

The presentation must be kept as simple as possible. A single, static PowerPoint slide is allowed and must be presented at the beginning of the presentation.

Students interested in participating may submit their applications online. The deadline is 11:59PM on Monday, January 20, 2014. Students will be notified by January 22 whether they have been selected to be one of the 15 presenters.

by Madison Parks

Introducing the ORCA-strator of CPMS Grants: Marilyn Webb

A violin concerto is punctuated by the sound of rasping papers in the office of the new CPMS ORCA liaison, Marilyn Webb.

Webb has been working for BYU for over 36 years in the College of Family, Home, and Social Sciences, the last 17 in the financial division. After 36 years, Webb said, it was difficult to leave her family at FHSS, but coming over to ORCA felt like coming home.

Webb is very passionate about the ORCA/MEG grant process and what it does for the members of the program. Students and faculty can apply for these grants through the program to help fund research projects that they work on together. Webb is also in charge of handling the paperwork on external proposals from CPMS that are sent out to different organizations for further sponsorship.

"The teachers can take their time to work with the students and to be able to do the actual research and teaching. My involvement will help move the process along, so I am kind of a small cog

in the wheel," Webb said.

The ORCA grants can really have a lasting impact on the students as well, Webb said. Often, ORCA students will return to BYU for graduate work. Webb thinks this is due to positive experiences the students had with their mentors and projects.

"Not only does it give the students a chance to experience being in a research lab, but it helps, in some cases, to solidify their future. This way the students can actually see what they are hearing in the classroom applied," Webb said.

When Webb isn't a financial wizard on the clock, she enjoys playing the viola in the Utah Valley Symphony, romping around with her dog, and curling up with a good book.

Webb is new to the position, but she is learning quickly and is excited to be available to help the grant-seekers.

"My door is always open and everyone should feel free to contact me," Webb said. "After all, my sign does read, 'Welcome.'"



Above: Marilyn Webb is the new CPMS ORCA liaison.

Webb can be contacted at extension 2-3607 and at marilyn_webb@byu.edu. She currently has an office in the ASB, A-286.

by Mackenzie Brown

Supervolcanoes discovered in Utah by BYU geologists



Above: BYU geologists Eric Christiansen and Myron Best.

Brigham Young University geologists found evidence of some of the largest volcanic eruptions in earth's history right in their own backyard.

These supervolcanoes aren't active today, but 30 million years ago more than 5,500 cubic kilometers of magma erupted during a one-week period near a place called Wah Wah Springs. By comparison, this eruption was about 5,000 times larger than the 1980 Mount St. Helens eruption.

"In southern Utah, deposits from this single eruption are 13,000 feet thick," said Eric Christiansen, the lead author for the BYU study. "Imagine the devastation – it would have been catastroph-

ic to anything living within hundreds of miles."

Dinosaurs were already extinct during this time period, but what many people don't know is that 25-30 million years ago, North America was home to rhinos, camels, tortoises and even palm trees. Evidence of the ancient flora and fauna was preserved by volcanic deposits.

The research group, headed by Christiansen and professor emeritus Myron Best, measured the thickness of the pyroclastic flow deposits. They used radiometric dating, X-ray fluorescence spectrometry, and chemical analysis of the minerals to verify that the volcanic ash was all from the same ancient super-eruption.

They found that the Wah Wah Springs eruption buried a vast region extending from central Utah to central Nevada and from Fillmore on the north to Cedar City on the south. They even found traces of ash as far away as Nebraska.

But this wasn't an isolated event; the BYU geologists found evidence of fifteen super-eruptions and twenty large

calderas. The scientific journal *Geosphere* recently published two of their papers detailing the discoveries.

Despite their enormous size, the supervolcanoes have been hidden in plain sight for millions of years.

"The ravages of erosion and later deformation have largely erased them from the landscape, but our careful work has revealed their details," said Christiansen. "The sheer magnitude of this required years of work and involvement of dozens of students in putting this story together."

Supervolcanoes are different from the more familiar stratovolcanoes – like Mount St. Helens – because they aren't as obvious to the naked eye and they affect enormous areas.

"Supervolcanoes as we've seen are some of earth's largest volcanic edifices, and yet they don't stand as high cones," said Christiansen. "At the heart of a supervolcano instead, is a large collapse."

Those collapses in supervolcanoes occur with the eruption and form enormous holes in the ground in plateaus, known as calderas.

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Upcoming Events

Izatt-Christensen Lecture- Mario Capecchi, University of Utah

Technical lecture, "Gene Targeting into the 21st Century: Mouse Models of Human Disease from Cancer to Neuro-Psychological Disorders," will be Friday, January 24. at 2 p.m. in W112 BNSN. General lecture, "The Making of a Scientist: An Unlikely Journey," will be at 4 p.m. in the JSB Auditorium.

Annual College Awards Banquet

Friday, January 24 from 6 to 8 p.m. in WSC Ballroom

CPMS "3-Minute Thesis" (3MT) event for graduate students

Friday, January 31 from 12-1 p.m. 3rd floor commons, Hinckley Center. For more information, visit <http://goo.gl/FsQzdy>

Women's Career Conversations

For female CPMS students.

Friday, February 7 at 12 p.m. in the HC Assembly Hall. Contact Lynn Patten, lynn_patten@byu.edu, for more information.

STEM Fair Preview

Wednesday, February 12 at 4 p.m. in 1170 TMCB

Career Networking

Meet industry representatives to learn how best to "Ace the Interview" at the career networking event held Wednesday, February 12 at 7 p.m. in the Clyde Building commons area.

STEM Career Fair

Thursday, February 13 from 9 a.m. to 3 p.m. in WSC Ballroom

University "3-Minute Thesis" (3MT) event

Wednesday, February 26
<http://gss.byu.edu>

2014 Utah Conference on Undergraduate Research (UCUR)

Friday, February 28
Register by Wednesday, January 15
www.UCUR.org

2014 Student Research Conference (SRC)

Saturday, March 15, JKB

Finding Passion through Mathematics

The College of Physical and Mathematical Sciences welcomes Jared Whitehead as a new assistant professor in the Department of Mathematics.

Whitehead completed his undergraduate education at BYU, graduating magna cum laude in mathematics in 2006. He earned his PhD at the University of Michigan in 2012 where he studied applied and interdisciplinary mathematics. During his education, Whitehead completed internships with MIT Lincoln Laboratories and the National Security Agency.

Since receiving his PhD, Whitehead has been a post doctorate research associate at Los Alamos National Laboratory in the Center for Nonlinear Studies, where he has continued research in geophysical fluid mechanics.

Whitehead's interest in mathematics began early in his education, stemming from a love of stretching himself to learn difficult concepts.

"As a freshman at BYU, I took a class from Kening Lu that challenged me significantly, but also showed me mathematics was fun and the basis for nearly all the other sciences so that, as a math-



Above: Jared Whitehead is a new professor in the Department of Mathematics.

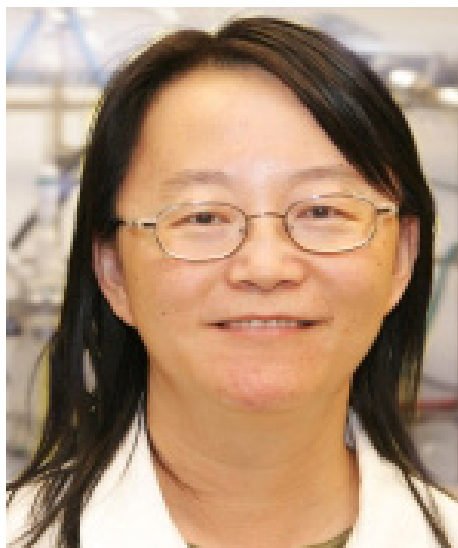
ematician, I could really contribute to whatever other field I chose," he said.

Similarly, Whitehead's current research in fluid dynamics appealed to him because of its challenging nature and the fact that it was applicable to other areas outside of mathematics.

As a professor, Whitehead hopes to

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Chemistry Graduate Becomes a Hero



Above: Chemistry graduate Zhifeng Ye.

Zhifeng Ye, a 2005 MS graduate of the Department of Chemistry and Biochemistry, was recently honored as a Hero of Chemistry by the American Chemical Society for her work on the development of a new drug that treats the underlying cause of cystic fibrosis (CF).

Ye is currently the senior technical operation manager at Vertex Pharmaceuticals, Inc. She and her team were honored for the development of Kalydeco, a revolutionary new drug that treats the cause of CF by binding to the defective regulator protein leading to improved lung function.

Kalydeco is currently approved to treat CF patients with the G551D-CFTR protein defect, about four percent of CF patients in the United States. Additional studies are planned in the future to determine whether Kalydeco can help patients with other CF mutations, according to C&EN news.

"It's been a big seller and a breakthrough in the pharmaceutical area. It's great to have a student like Zhifeng from BYU being one of the key players in it," said chemistry professor Merritt Andrus, who was Ye's graduate advisor while she was at BYU.

Andrus noticed Ye's talents early on in her master's program.

"She was a very prepared, very serious student," he said. "I wish she would have stayed on as a PhD student."

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Announcements

Nominations for College Awards
DUE in College:

Wednesday, January 15 at 5 p.m.

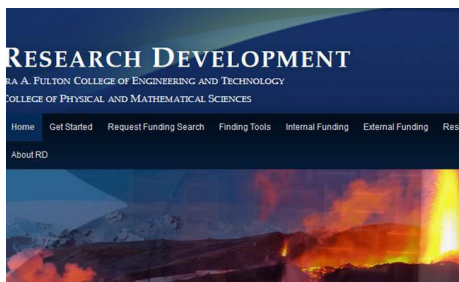
Nominations for University
Awards DUE in College

Friday, January 31 at 5 p.m.

Faculty Profile Updates DUE to
University

Friday, February 28 at 5 p.m.

Research Development



Research Development Second Speed Networking Event

We had a successful Speed Networking Event on Friday December 13.

Fifty-eight faculty from the colleges of Physical and Mathematical Sciences, Engineering and Technology, Life Sciences, Business and Family Health and Social Sciences attended. Twenty-eight provided three-minute briefings about their research. We "networked" over refreshments afterwards.

Overwhelmingly, the participants felt the event was quite useful, helped them form research collaborations across disciplines and should be held again.

The presentations from this event as well as the presentation from the first Speed Networking Event held in August can be found on the Research Development website <http://research-development.byu.edu/resources/faculty-research>

January Retirees



Bruce Collings, Professor in the Department of Statistics, has retired. He has been teaching at BYU since 1988, including teaching a few years in the Department of Mathematics. He has been involved in research interests that include actuarial science and computational statistics. Bruce taught many upper level statistics courses, as well as the introductory Stat 121 class. He is a member of the American Statistical Association and the Society of Actuaries. Bruce is a 2003 recipient of the Alcuin Fellowship in General Education and has strong commitments to excellence in teaching. He cites his favorite part of teaching at BYU as "the work environment, and working with people who are similar in life style and world views." Following retirement, he plans to serve a mission with his wife, visit his grandkids, and pursue his hobby of making jewelry.

by Meg Monk



Phillip Brown, Professor in the Department of Chemistry and Biochemistry, has retired. Phillip has been teaching at BYU since 1993, and has been a full-time teaching professor since 1997. Since then, he has been the Faculty Coordinator for the freshman general chemistry laboratory course and lectured introductory chemistry courses on a regular basis. "I have thoroughly enjoyed my BYU experience and have really appreciated the freedom to mingle my testimony with my subject matter as I felt so prompted," Phillip said. "This is a unique freedom any more, and should be frequently utilized by both faculty and students to strengthen each other." After retirement, which he said comes with "mixed emotions," Phillip hopes to serve as many missions as the Lord, health, and money allow. He also plans to spend time on family history and temple work.

by Meg Monk

Volcano continued from page 2

Not many people know that there are still active supervolcanoes today. Yellowstone National Park in Wyoming is home to one roughly the same size as the Wah Wah Springs caldera, which was about 25 miles across and 3 miles deep when it first formed.

More than a dozen undergraduate and graduate students made significant contributions to Best and Christiansen's papers. Hundreds of other students were involved with the geologic mapping of the volcanic areas. The skills and experience each student gained along the way have opened doors to graduate schools, employers and en-



Above: Thirty million years ago, the eruption of the Wah Wah Springs supervolcano was about 5,000 times larger than the 1980 Mount St. Helens eruption

trepreneurship. Mentored learning is part of why BYU ranks in the Top 8 nationally in terms of where new Ph.D.'s received their undergraduate degrees.

by BYU News

College Publications

Mathematics

[Eric Swenson](#), "On Cyclic CAT(0) Domains of Discontinuity", *Groups Geom. Dyn.* 7(3), 2013, pp. 737-750.

College Grants

Chemistry & Biochemistry

[Paul Savage](#)

Sponsor: University of Bern

Title: Preparation of Oxidized Forms of Prostaglandin

Computer Science

[Kevin Seppi](#)

Sponsor: Utopia Compression

Title: Enhancing Cooperative Control With Hierarchical Intelligence and Learning, Phase 2

College Patents

Mathematics and Statistics

Jared Webb, [Rodney Forcade](#),
Christopher Guzman, [Jeffrey Humpherys](#), [C. Shane Reese](#)

Title: Robust watermarking for digital media

Date awarded: November 19, 2013

Lecture continued from page 1

joined the faculty at the University of Utah School of Medicine. Since 1988 he has also been an investigator at the Howard Hughes Medical Institute. Best known for his pioneering work in gene targeting, Dr. Capecchi has worked extensively with genetically altered models to examine gene function that permit researchers to study the function(s) of that gene.

"Because nearly all biological phe-

nomena are mediated or influenced by the activity of genes, this methodology permits the analysis of the most complex biological processes such as development, learning, normal and aberrant behavior, cancer, immunology and a multitude of congenital human diseases," Dr. Capecchi explained.

by Meg Monk

Passion continued from page 3

help his students seek their passion as he did.

"The most important aspect of choosing a career is finding something you truly enjoy doing," he said. "If you like it enough, you can become good at it . . . and it becomes easy to make a comfortable living."

Whitehead and his wife, Samantha, have four children—one son and three daughters. They enjoy hiking, biking, being outside, and traveling together.

In his spare time, Whitehead enjoys trail running and mountain biking.

Whitehead will begin teaching applied mathematics and mathematical physics courses in January 2014 and looks forward to working with BYU's exceptional student body.

"The quality of the students at BYU allows for a much more realistic and higher goal to be set in any course than at most comparable institutions," Whitehead said.

by Meg Monk

Hero continued from page 3

Ye went straight from her graduate program to Vertex, a company founded by Stuart Schreiber, Andrus' former advisor during his post-doctoral fellowship at Harvard University.

"She didn't do a PhD or a post-doctoral fellowship; she went right from school to industry," Andrus said. "It was her training at BYU that let her do so well."

The ACS Heroes of Chemistry pro-

gram has recognized outstanding accomplishments by chemical scientists in industry since 1996. Vertex was one of four pharmaceutical companies recognized at this year's awards ceremony.

"It's a very prestigious thing," Andrus said. "Most chemists work their whole career and never come close to anything like this."

by Meg Monk

