The mission of the UW Stem Cell and Regenerative Medicine Center is to advance the science of stem cell biology and foster breakthroughs in regenerative medicine through faculty interactions, research support and education.

Fall 2012

SCRMC Notes

Number 7





Students *(upper) versus professors (lower) in* a challenging game of Stem Cell Jeopardy at our Fall Conference in September. *(Photos by S. Zorn)*

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Bill Murphy is New SCRMC Co-director

by Jordana Lenon

UW-Madison's Stem Cell & Regenerative Medicine Center (SCMRC) welcomes as its new co-director **William Murphy**, Ph.D., Harvey D. Spangler professor of biomedical engineering and orthopedics and rehabilitation. He joins **Timothy Kamp**, M.D., Ph.D., professor of cardiovascular medicine, at the helm.

Murphy served on the SCMRC's first executive committee in 2007. More recently, as associate director, he led the formation of new scientific focus groups within the center. He received his Ph.D. in biomedical engineering from the University of Michigan in 2002, and was a postdoctoral fellow in chemistry at the University of Chicago from 2002-2004. His lab team designs and synthesizes new "bioinspired" biomaterials to address a variety of regenerative medicine challenges, including stem cell differentiation, tissue regeneration, and controlled drug delivery. He is a past recipient of the National Science Foundation Career Award and the Wisconsin Vilas Associate Award.

"I am delighted that Bill has agreed to increase his leadership role within the Stem Cell and Regenerative Medicine Center," Kamp said. "Having Bill as co-director will help us reach across campus and empower interdisciplinary collaborations, particularly with colleagues in the College of Engineering. Bill and I share a common view of the importance of collaborative research and translational studies in this complex but incredibly promising field."

"It is a privilege to help lead such a unique and important center," Murphy said. "I look forward to working with Tim to build upon the strong foundation of stem cell science at Wisconsin."

The co-directors work with the SCRMC executive committee, staff and members to chart the course of this diverse and growing center: The SCRMC now boasts more than 85 faculty members spanning more than 30 departments, schools, colleges and centers across campus.

FEATURED RESEARCHER

Solving the Mysteries of Epigenetic Reprogramming

by Jordana Lenon



A militia of researchers that did not exist 15 years ago is deep in the trenches working on engineering human pluripotent stem cells into therapeutic cells and tissues using new in vitro models and biomaterials.

Stepping into the ranks of these bioengineers at UW-Madison working with defined culture conditions, cellular signaling pathways and growth factors using material sciences and synthetic biology methods is **Krishanu "Kris" Saha**, Ph.D. He is an assistant professor new to the Department of Biomedical Engineering and the Wisconsin Institute for Discovery (WID) this fall.

Previously at the Whitehead Institute for Biomedical Research at MIT as well as Harvard University, Saha has worked on understanding the biology of epigenetic reprogramming and solving bottlenecks in the process since starting as a post-doc there in 2007.

During his talk September 11 for the SCMRC weekly seminar series, Saha listed some of the major obstacles to successfully reprogramming one cell type to another. For starters, only a smidgen of cells researchers manipulate actually reprogram; many die along the way or do not fully reprogram. In addition, the process takes several weeks—two if you're lucky, 18 or more if you're not. Finally, it's messy; many undefined cells are produced.

Using mouse models and human cells, Saha wants to improve the cocktails researchers use to reprogram stem cells into somatic cells, or to transform one somatic cell into another somatic cell. He has recently worked with the transcription factors C-Myc, Klf4, Sox2 and Oct4, and will start adding others to the mix to perfect his recipe, depending on what outcomes he is seeking.

At MIT, Saha hypothesized that perhaps the founder somatic cells he was starting with weren't really reprogramming at all: perhaps only a few adult stem cells residing among the somatic cells were the real changelings… but he tested his theory and proved himself wrong. So it was onto looking for other possible culprits.

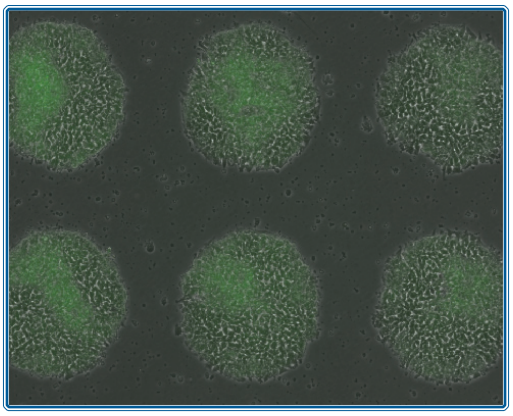
In looking for better ways to reprogram cells, Saha will also continue introducing additional transcription factors, small molecules and growth factors that latch onto particular cells. He will track the cells through flow cytometry, then analyze which of cells have actually reprogrammed and under what conditions. He found that in one experiment in Rudolf Jaenisch's lab at MIT, 90% of his blood-derived cells could be reprogrammed into embryonic like cells. Yet his microwells of cells morphed at different rates, from anywhere between 2 to 19 weeks, so he wants to figure out how to produce more of them on the lower end of this time range.

"Using microarrays and gene expression data, we need to define more specific culture conditions for different types of reprogramming experiments, such as mesenchymal cells to epithelial cells," Saha said. Mesenchymal stem cells can also be genetically reprogrammed into bone, cartilage, fat and other differentiated somatic cells. This makes them a highly attractive target for

stem cell researchers looking to make smarter therapeutics, model human disease, and advance personalized medicine.

"There are tons more genes that have been discovered that switch on and off and are implicated in reprogramming," Saha said.

Saha also has applied his chemical engineering training to making new biomaterial surfaces for the reprogrammed stem cells. Typical protocols for growing up the human stem cells after reprogramming typically used complex mixtures of animal-derived proteins or cells. Saha has developed synthetic polymers that could replace these animal components and is working to understand how cells attach to synthetic materials. He hopes that this work will couple well with existing efforts in the BIONAnocomposite Tissue Engineering Scaffolds (BIONATES) theme at the WID. Among the projects that the BIONATES theme is perusing is to make microscopic human spinal cord tissues to fit within multiwall Petri dishes. These capabilities would help us take routine skin biopsies and blood samples from neurodegenerative patients into the lab and enable the production of patient-specific disease models for personalized drug toxicology and discovery.



Human embryonic stem cells are constrained and micro-patterned by specially engineered surfaces. The image is taken after several months of culture of transgenic human embryonic stem cells expressing green fluorescent protein from the Oct4 locus. *(Photo courtesy of Saha lab.)*

These new capabilities with human cells, such that patient's cells are engineered to persist for the long term in the lab, also raise complex questions about the proper interface between the lab and the clinic. During his postdoctoral time, Saha used a Swiss fellowship—the Society in Science—Branco Weiss Fellowship—to explore the social and cultural implications of creating "diseases-in-a-dish" from reprogrammed cells. He sees these stem cell based technologies as integrating with genomics, proteomics, and other quantitative ways of redefining disease state with techniques rooted in the lab. At UW, he plans to work with students and professors across the law, social sciences and humanities to explore the role of patients, researchers, institutions, and government in this domain.

Stem cell scientists and physicians have often been described as being on the front lines, studying new cellular and regenerative medicine approaches to "search and destroy" diseases and their devastating effects. Saha and his colleagues in the growing field of biomedical engineering might also be described as new partners in the elegant dance on the home front. They use their own special methods of cellular choreography to introduce genetic partners and growth factors, to instruct the dance and create something new and influential.

With his time outside of lab, Kris looks forward to raising his 9-month old daughter, Mackenzie Anjali, with his wife, Michele Bernius, and playing basketball and tennis in Madison.

Saha is now recruiting graduate students and post-docs in his lab. Visit his departmental page. Contact him at ksaha@wisc.edu.

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Saha K.*, Mei Y.*, Reisterer C.M., Pyzocha N., Yang J., Muffat J., Alexander M.R., Langer R., Anderson D.G. and Jaenisch R. (2011) "Surface-engineered substrates for improved human pluripotent stem cell culture under fully defined conditions." *Proceedings of the National Academy of Sciences of the USA. 108(46), 18714-9.*

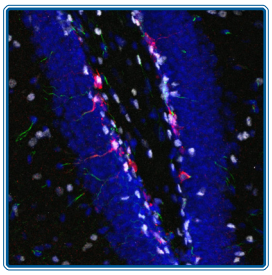
Hanna J.*, **Saha K.***, Pando B., van Zon J., Lengner C.J., Creyghton M.P., van Oudenaarden A., and Jaenisch R. (2009) "Direct cell reprogramming is a stochastic process amenable to acceleration." *Nature. 462, 595-601. [*equal contribution]*

Saha K. and J.B. Hurlbut (2011) "Treat donors as partners in biobank research." *Nature. 478, 312-313.*

Mathews D.J.H., Graff G.D., **Saha K.**, Winickoff D.E. (2011) "Access To Stem Cells And Data: Persons, Property Rights, And Scientific Progress." *Science. 331, 725-727.*

Research Highlights

September 26, 2012

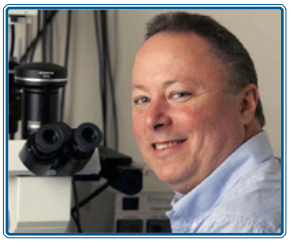


[The language of stem cells, decoded]

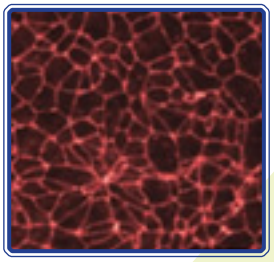
SCRMC member **Randy Ashton** is seeking to instruct the development of human stem cells in the lab by using the molecules cells already use to communicate with one another. *(Image: neural stem cells in the dentate gyrus region of the hippocampus co-labeled with Sox2 (white), Nestin (green), and genetically engineered induction of beta-galactosidase (red). The nuclei of all calls are stained in blue. [Courtesy of Ashton lab].)*

September 10, 2012

[New genetic mechanism for controlling blood cell development and blood vessel integrity]



When a mutation occurs in the gene that makes GATA2, a "master regulator" of blood cell development, serious blood diseases such as acute myeloid leukemia can result. SCMRC member **Emery Bresnick** has discovered that a small DNA sequence drives this powerful master regulator.



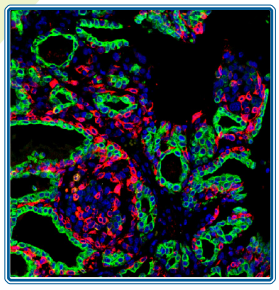
June 25, 2012

[Blood-brain barrier building blocks forged from human stem cells]

Researchers in the lab of SCRMC member **Eric Shusta** have created in the laboratory dish the cells that make up the protective blood-brain barrier. *(Image: Brain endothelial cells express characteristic human blood-brain barrier and using occludin as a endothelial marker. Courtesy of Shusta lab.)*

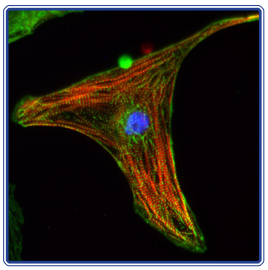
May 30, 2012

[Breast stem cell research: Receptor teamwork required and a new pathway may be involved]



SCRMC member **Caroline Alexander** has found that two related receptors in a robust signaling pathway must work together as a team to maintain normal activity in mammary stem cells. Mammary stem cells produce various kinds of breast cell types and may also drive the development and growth of malignant breast tumors. *(Image: (Image of mammary cells courtesy of Caroline Alexander.)*

May 28, 2012



[New stem cell technique promises abundance of key heart cells]

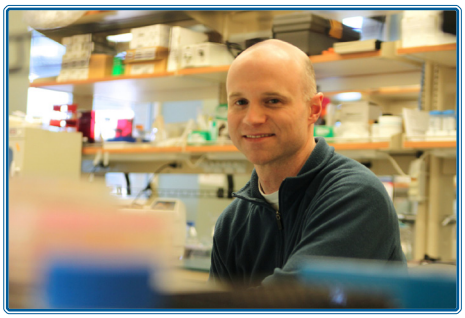
SCMRC member **Sean Palecek**, SCRMC Co-Director Tim Kamp and colleagues have transformed human embryonic and induced pluripotent stem cells into critical heart muscle cells by manipulating one key developmental pathway. The technique promises a uniform, inexpensive and far more efficient alternative to the complex bath of serum or growth factors now used to nudge blank slate stem cells to become specialized heart cells.

Apply now for ICTR Pilot Grant Awards

SCRMC is once again partnering with the UW-Madison Institute for Clinical and Translation Research (ICTR) on its pilot grant award program. These $50,000 one-year, Type 1 pilot grants support basic research, clinical trials, and research where a basic laboratory discovery may lead to the prevention, diagnosis, or treatment of a specific disease. Type 1 funding also supports a wide spectrum of patient-oriented research that embraces innovations in technology and biomedical devices. The program is targeted at new investigators or investigators taking a new direction. The program provides peer review of applications. For 2013, the SCRMC will jointly support two grants. *Letters of intent for the 2013 round of ICTR grants are due February 1, 2013. See https://ictr.wisc.edu/FundingOpportunities for more information.*

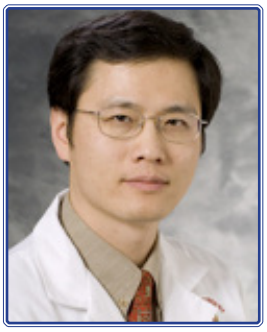
April 19, 2012

Who knew? Five questions with Bill Murphy about biotech innovation



SCRMC Co-Director **Bill Murphy** and his students develop new biomaterials, new uses for biomaterials, and new approaches for drug delivery and gene therapy. He has co-founded two spin-off companies, collaborated with several other established companies, and filed 16 patents. *(Image: Bill Murphy courtesy of College of Engineering.)*

April 3, 2012



One compound detects and treats malignant tumors, certain cancer stem cells

More than a decade of laboratory research at UW-Madison has proven that a single chemical compound may both detect and treat malignant tumors and certain cancer stem cells. SCRMC member Jamey Weichert is involved in these exciting advances involving CLR1404, a "diapeutic" agent that can both image and destroy a wide range of malignant tumors and the one type of cancer stem cells examined so far. *(Images:* **John Kuo** *[left] and* **Jamey Weichert** *[right].)*



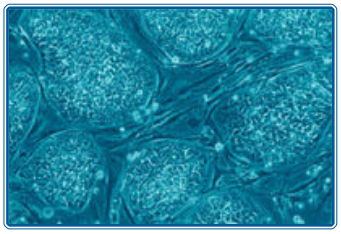
SCRMC Executive Committee Opportunities

All SCRMC members contribute and benefit from the center, but we especially receive leadership and guidance from our executive committee. This is the time of year when we elect two new members to the executive committee to replace (or renew) those members whose three-year commitment has been completed. The current executive committee consists of three permanent members—co-directors of the center, **Tim Kamp** (Medicine) and **Bill Murphy** (Biomedical Engineering / Orthopedics and Rehabilitation) and director of WiCell, **Erik Forsberg**—and four to five elected members from the following three categories (listed with the incumbant and when their term is up):

- SMPH: **Su-Chun Zhang** (12/2013)
- College of Engineering: **Sean Palecek** (12/2014)
- College of Letters and Sciences: **Linda Hogle** (12/2012)
- Members-at-Large: **Emery Bresnick** (12/2012); **Brenda Ogle** (11/2013)

The terms of **Linda Hogle** and **Emery Bresnick** are near completions, we welcoming nominations for two positions: one for a member of the College of Letters and Sciences and one as a Member at Large. Self-nomination is encouraged as is nomination by colleagues with permission of the nominee. Each nominee will need to provide a paragraph statement about their priorities and vision for SCRMC. Nominations are due to Sue Gilbert by November 30. Voting will then take place electronically by December 16.

In The News



August 14, 2012

[U.S. Appeals Court Upholds Legality of Stem Cell Research]

A federal appeals court upheld a lower court's ruling that dismissed a lawsuit claiming that NIH funding for research on human embryonic stem cells violated a law banning federal funds for research that harms or destroys human embryos. *(Image from Wikimedia Commons/Nissim Benvenisty/Vojtech.dostal.)*



August 8, 2012

[Million-dollar Keck Foundation grant funds UW-Madison genome research]

An interdisciplinary team of scientists and engineers at the University of Wisconsin-Madison received a $1 million grant from the W.M. Keck Foundation to fund research into creating synthetic genome "foundries." *(Image: Aseem Ansari.)*



July 24, 2012

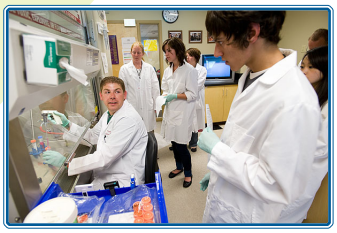
[Thomson lab lands $2.2 million NIH grant]

With a $2.2 million NIH grant, stem cell pioneer and SCRMC member James Thomson, along with SCMRC Co-Director Bill Murphy and medical informatics professor David Page will lead a team to derive and assemble the distinct cell types found in the human cerebral cortex. *(Image: James Thomson.)*

July 17, 2012

[Northern Wisconsin high schoolers learn with stem cells, UW researchers]

Eighteen top science students from northern Wisconsin high schools earned the opportunity to hone their laboratory skills and work alongside leading campus researchers at a summer science camp focused on stem cells. *(Photo by Jeff Miller, UW-Communications.)*





June 29, 2012

[Vision scientist Dr. David Gamm to lead UW Eye Research Institute]

SCRMC member David Gamm, whose lab is internationally known for deriving human retina cells and tissue-like structures from human stem cells, has been selected as director of the University of Wisconsin Eye Research Institute (ERI). *(Image: David Gamm.)*

Find more news in our [News Archives.]

Google groups

Want to stay up to date about activities associated with the UW SCRMC or of interest to our members? Subscribe to Stem Cell Announcements by going to our [Google group].

Welcome New SCRMC Members

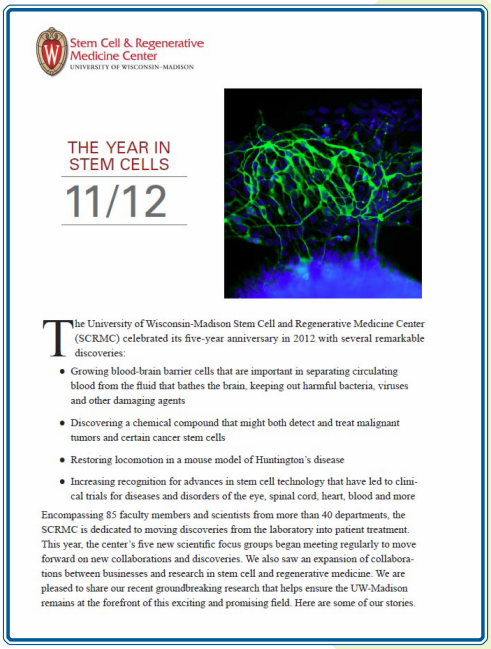
(new within the past year)

Faculty and Staff:

Christian Capitini, Pediatrics
John Centanni, Cardiology
Celina M. Checura, Medical Sciences
Ying Ge, Cell and Regenerative Biology
Krishanu Saha, Biomedical Engineering
Rupa Sridharan , Cell and Regenerative Biology

Students:

Michael Jay Phillips, Masters in Biotech
Michael Joseph Phillips, Fellow, Gamm Lab
Jonathan Van Dyke, Fellow, Suzuki lab



Stem Cell & Regenerative Medicine Center
UNIVERSITY OF WISCONSIN-MADISON

THE YEAR IN STEM CELLS
11/12

The University of Wisconsin-Madison Stem Cell and Regenerative Medicine Center (SCRMC) celebrated its five-year anniversary in 2012 with several remarkable discoveries:

- Growing blood-brain barrier cells that are important in separating circulating blood from the fluid that bathes the brain, keeping out harmful bacteria, viruses and other damaging agents
- Discovering a chemical compound that might both detect and treat malignant tumors and certain cancer stem cells
- Restoring locomotion in a mouse model of Huntington's disease
- Increasing recognition for advances in stem cell technology that have led to clinical trials for diseases and disorders of the eye, spinal cord, heart, blood and more

Encompassing 85 faculty members and scientists from more than 40 departments, the SCRMC is dedicated to moving discoveries from the laboratory into patient treatment. This year, the center's five new scientific focus groups began meeting regularly to move forward on new collaborations and discoveries. We also saw an expansion of collaborations between businesses and research in stem cell and regenerative medicine. We are pleased to share our recent groundbreaking research that helps ensure the UW-Madison remains at the forefront of this exciting and promising field. Here are some of our stories.

Just published –

The Year in Stem Cells 11/12

A report on progress in stem cell and regenerative medicine research, education and outreach at the UW-Madison, produced by the University of Wisconsin Foundation and the SCRMC.

Rupa Shevde Departs



Rupa Shevde, Ph.D., the SCRMC's tireless administrative and outreach partner these past five years, in July accepted an international marketing position with Life Technologies, a global biotechnology company with offices in Madison. Shevde provided stem cell training to hundreds of scientists, shared her expertise with colleagues on campus and worldwide, and pursued her own research in bone disease. She organized and led educational outreach experiences for the general public, first through WiCell and later through Morgridge Outreach Experiences. She provided unique learning experiences for hundreds of children, teachers, journalists, legislators and others through hands-on training, videos and articles in Nature and other science journals. We thank Rupa for her 11 years of dedication to science and outreach at the UW-Madison and its partnering organizations and wish her all the best in her new endeavors.

Public outreach update – from Madison to Marinette

by Jordana Lenon, outreach specialist, UW-Madison Stem Cell & Regenerative Medicine Center and Wisconsin National Primate Research Center

An exciting roster of events engaged thousands of people in stem cell and regenerative medicine learning this fall. Coordinating many of these efforts were staff with Morgridge Outreach Experiences (MOE), the Wisconsin Institutes for Discovery (WID) Town Center, the UW-Madison Stem Cell & Regenerative Medicine Center (SCRMC), the Wisconsin National Primate Research Center (WNPRC), and The Wisconsin Stem Cell Roundtable (WSCR) graduate students and post-docs.

On September 1, the MOE team hosted "The Science of Stem Cells" at WID, where more than 50 young students explored 13 stem-cell themed exploration stations. A few weeks later, MOE educators taught an "Afterschool Expeditions" session on directed differentiation to 30 middle schoolers. Also in mid-September, **Jordana Lenon**, B.S., SCRMC outreach specialist, overviewed stem cell and regenerative medicine research to an audience of 70 at the Wisconsin Association for Home and Community Education's State Conference in Middleton. She then presented to 20 life-long learners for the UW-Madison PLATO (Participatory Learning And Teaching Organization) lecture series, part of the UW-Madison Division of Continuing Studies.

On September 29, an appreciative audience of 175 people listened to Valerie Joers, B.S., WNPRC, and **Ron Kalil**, Ph.D., SMPH and SCRMC, speak at the American Parkinson's Disease Association, Wisconsin Chapter, Annual Symposium at St. Mary's Hospital.

An army of campus educators put together what may very well be the largest science fair to date on the UW-Madison campus—The 2012 Wisconsin Science Festival, which ran September 27-30. MOE activities included stem cell clay culture, pipetting, viewing cells under the microscope, and teacher training, "Integrating the Science of Stem Cells into the Middle School Classroom". WISCR and WNPRC also included stem cell outreach at their stations. The festival reached 10,000 participants over four days at WID and satellite locations.



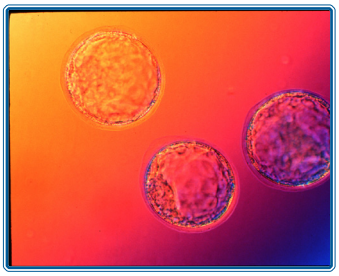
WISCR students Garrett Lee, Stefan Zorn and Ka Yi Ling (not pictured) ran a stem cell outreach station at the Wisconsin Science Festival. *(Photo by J. Lenon)*

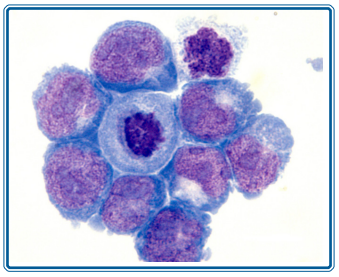
Stem cell outreach was on tap all autumn at the Wisconsin National Primate Research Center, where visitors to the WNPRC's Marmoset Learning Lobby explore topics in research and animal care. **Irina Elcheva**, Ph.D., from **Igor Slukvin**'s hematopoietic stem cell lab, frequently speaks to groups about the lab's research. On one visit, she spoke in English and also in her native Russian to a group of 20 Russian foreign exchange students from Elkhorn High School in southern Wisconsin. The Primate Center was the birthplace of pluripotent stem cell research on the UW-Madison campus. This is where **James Thomson**, V.M.D., Ph.D., first successfully cultured rhesus, then marmoset monkey embryonic stem cells in the mid-1990s.

Hundreds of visitors enjoyed "UW-Madison and UW Extension Day" October

Apply now for Training Fellowships

The SCRMC Fellowship Program is an interdisciplinary predoctoral and postdoctoral program that aims to support the training of UW graduate students and post-doctoral fellows in interdisciplinary stem cell and regenerative medicine research. We are accepting applications until January 1, 2013, for two one-year fellowship positions with the possibility of renewal for a second year. Applications will be reviewed by January 15, 2013. Visit http://stemcells.wisc.edu/node/387 for more details.





(Left) Marmoset blastocysts, 1996. (*Image courtesy of James Thomson.) (Right) Myeloid progenitor cells*, 2011. (*Image courtesy of Igor Slukvin.)*

16 in northeastern Wisconsin. The vice-chancellor for community relations, campus faculty, staff and UW-Extension educators brought a giant inflatable Bucky Badger and a variety of educational displays and entertainment to Marinette High School. Jordana Lenon, B.S., hosted the SCRMC's popular stem cell exploration station, where students and teachers practiced their pipetting, looked at stem cells under the microscope, and asked questions about stem cells and regenerative medicine.

To round out SCMRC autumn outreach, Lenon, who has managed the popular "Stem Cell Learning Lab" at the Biotechnology Center through UW-Extension's Biotrek Program since 2009, debuted a take-home stem cell activity kit for teachers visiting the Madison Children's Museum's Family Science Night training event on November 13.

For more information on stem cell and regenerative medicine outreach events and activities at UW-Madison, please visit http://www.stemcells.wisc.edu, http://discovery.wisc.edu/town-center/, and http://www.primate.wisc.edu.

Campus Seminar Series Draws a Crowd Every Tuesday



The SCRMC-sponsored Campus Stem Cell Laboratory meetings, organized by Sue Gilbert, continues to draw a crowd, with up to 125 people typically attending these weekly talks to hear from their colleagues working in stem cell and regenerative medicine research across campus.

Occasionally, during this lunchtime series, we feature a visiting speaker. Our latest visiting speaker for the SCRMC weekly Campus Seminar Series was Melissa Wong, Ph.D., associate professor, Oregon Health & Science University. She spoke October 25 on a role for endogenous cell fusion in cancer progression.

Students can get one academic credit for attending the series, listed as: **Anatomy 675: Topics in Anatomy: Stem Cell Seminar**. Juniors, seniors and graduate students may enroll (previous biology coursework is recommended.) It will be section 021-LEC(81580) for spring 2013 semester. A list of upcoming events can be found here. *(Photo by S. Gilbert.)*

Find the University of Wisconsin Stem Cell and Regenerative Medicine Center on Facebook. Join more than 500 followers keeping up with seminars, news, photos, and more.

Scientific Focus Group Updates

Molecular Cellular Hematology Group

*by **Emery Bresnick***

We have a new member joining us from the National Cancer Institute, NIH, as a tenure-track assistant professor of medicine (hematology/oncology): Dr. Lixin Rui conducted his Ph.D. research with Christopher Goodnow, B.V.Sc., Ph.D., a renowned cellular immunologist at the Australia National University (John Curtin School of Medical Research) and then conducted postdoctoral studies with Louis Staudt, M.D., Ph.D., at the National Cancer Institute, NIH. Lixin's work will focus on mechanisms underlying normal and malignant hematopoiesis, with a particular emphasis on lymphomagenesis.

The group continues to meet monthly to discuss discoveries emerging from our individual and collaborative research efforts. Efforts are underway to develop collaborative extramural funding focusing on the convergence of novel signaling and transcriptional mechanisms in the context of leukemogenesis and also on the genetic analysis of drug resistance in myeloma.

Neural Regeneration Group

*by **Anita Bhattacharyya***

Following a year of research presentations and a very successful spring symposium the SCRMC Neural Regeneration Focus Group started the fall with a focus on collaboration.

We started the new academic year in September with a strategic planning meeting focused on the feasibility of developing a postdoctoral training grant. We are working to define the theme of the training grant to both take advantage of the strengths of the campus as well as distinguish it from other training grants. Other challenges in this effort include identifying the appropriate NIH institute as well as the PI and senior trainers. These will partly be dictated by the theme.

We are alternating strategic planning meetings with presentations of ongoing and planned collaborative projects. Current collaborations within the group include reactivation of the Fragile X gene to study neurogenesis in vivo by **Anita Bhattacharyya**, Ph.D., and **Xinyu Zhao**, Ph.D. In addition, Tim Gomez, Ph.D., and **David Gamm**, M.D., Ph.D., are proposing a project to study axon guidance in human tuberous sclerosis neurons. The awareness of these cooperative efforts initiated much discussion during the meetings and will undoubtedly help us move forward to secure collaborative funding.

We welcomed **Kris Saha**, Ph.D., to the group. (He is this newsletter's "Featured Researcher.") Kris joined the Department of Biomedical Engineering and the BIONATES theme at the Wisconsin Institutes for Discovery as an assistant professor. His interests lie in using human stem cells together with emerging engineering methods in material science and synthetic biology to make smarter therapeutics, model human disease, and advance personalized medicine.

Musculoskeletal Regeneration Group

*by **Ben Graf***

The musculoskeletal focus group has benefited from the promotion of Dr. **Mark Markel** to Dean of the School of veterinary medicine and the naming of Dr. **William Murphy** as the co-director

Save the Date

"Cell-Based Therapy for Heart and Vascular Disease: Pathways to Clinic"

8TH ANNUAL WISCONSIN STEM CELL SYMPOSIUM

April 10, 2013

BTCI (BioPharmaceutical Technology Center, Fitchburg)

Find the schedule, speakers, poster contest and more at: http://www.btci.org/stemcell/default.html

of the SCMRC. Two orthopedic traumatologists have joined the group, Drs. Goodspeed and Doro, the former having military experience as well as a UW appointment. We hope to further expand our capabilities by collaborating with Dr. **Xin Sun**, a UW developmental biologist with key publications in the field of limb development. A NIH grant proposal (BIRT mechanism) was recently submitted to connect Dr. Sun with an ongoing NIH-funded collaboration between Murphy and Dr. **Ray Vanderby, Jr.** The focus group is also exploring the application process for NIH training grants as a new way to facilitate multidisciplinary musculoskeletal research.

Stem Cell Bioengineering Group

*by **Brenda Ogle***

One of our goals in the last academic year was to galvanize efforts to improve graduate training in Stem Cell Bioengineering. One outcome of these efforts was that we generated a proposal for a doctoral training grant through the National Science Foundation's Integrative Graduate Education and Research Traineeship Program (IGERT). Focus group member **Sean Palecek**'s leadership was key in putting together this proposal. We are continuing this theme during the academic year by hosting group meetings in which doctoral and postdoctoral trainees have an opportunity to present their research. Our first meeting took place October 31 and featured, **Stefan Zorn**, Murphy Lab, "Thin hydrogels as a tool in stem cell biology: MSC migration studies"; Laurie Hazeltine, Palecek Lab, "Effects of substrate mechanics on contractility of cardiomyocytes generated from human pluripotent stem cells"; David Buschke, Ogle Lab, "Multiphoton flow cytometry to analyze and purify stem cell aggregates".

Cardiovascular Regeneration Group

*by **Amish Raval***

The Cardiovascular Focus group showcased the breadth of innovation, expertise and resources that exists among its members on September 21 at the Stem Cell and Regenerative Medicine Center (SCRMC) Fall Conference II. In addition, the Group is planning the 8th Annual Stem Cell Symposium which is scheduled for April 10, 2013 at the BioPharmaceutical Technology Center Institute, Madison, WI. The theme this year will be Cell-Based Therapy for Heart and Vascular Disease: Pathways to Clinic. The program includes a strong group of internationally recognized speakers who are involved in basic and clinical cardiovascular regenerative medicine research. Furthermore, the Symposium program was purposefully designed to follow the NHLBI-sponsored Production Assistance for Cellular Therapies Workshop, a program which has also been organized by several members of the Cardiovascular focus group. The Workshop is scheduled the day before the Symposium on April 9th at the Wisconsin Institutes of Discovery. Speakers include several leaders in the field of translational cell therapy, federal regulatory landscape and therapeutic cell production and manufacturing. Further information about the Symposium program and registration details can be found at here. The CV focus group plans to foster graduate education by providing trainees the opportunity to present their research at the monthly focus group meetings.

Fall Conference Recap

Close to 250 people attended the annual SCRMC Fall Conference at the Wisconsin Institutes for Discovery on September 21, 2012. Deepak Srivastava, Ph.D., The Younger Family Director, Gladstone Institute of Cardiovascular Disease, gave the morning keynote address, "Reprogramming Approaches for Cardiovascular Disease." Scientific Focus Group chairs described their research and services, followed by updates from the Wisconsin Stem Cell Roundtable (WISCR) graduate students and post-docs.

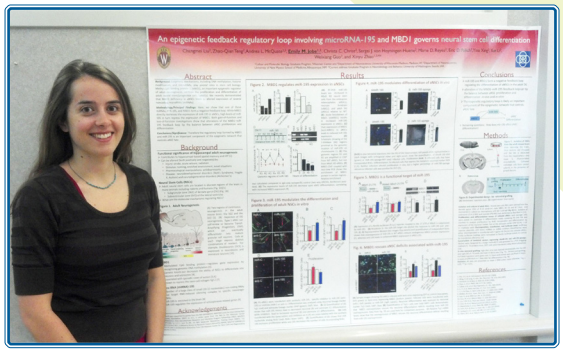
David Gamm, M.D., Ph.D., presented the afternoon keynote, "The Search for Retinal Stem Cells." Gamm is a Retina Research Foundation Edwin & Dorothy Gamewell Professor, and Director of the UW Eye Research Institute. The SCRMC staff also unveiled its new, interactive website. Conference participants enjoyed "Stem Cell Jeopardy," with the professors coming from behind winning on the last question over the students. An engaging poster session and reception ended the day.



(Left) Fall Conference Organizing Committee members were, from the left: Sanal Kumar, Andrew Handorf, Paul Wrighton, Stefan Zorn, and Weixiang Guo. *(Image by J. Lenon.)*



(Right) Keynote speaker Deepak Srivastava, Gladstone Institute, addressing the second annual Fall Conference. *(Photo by S. Zorn)*



(Left) Emily Jobe, a graduate student working with **Xinyu Zhao**, is pictured here with her poster entitled "An epigenetic feedback regulatory loop involving microRNA-195 and MBD1 governs neural stem cell differentiation". *(Photo courtesy of Xinyu Zhao.)*



(Right) Lance Lian, right, a graduate student working in **Sean Palecek**'s lab, accepts his poster award from Stefan Zorn. Lian's poster was titled "Human heart muscle cells regeneration from pluripotent stem cells via engineering Wnt signaling pathway." *(Photo by J. Lenon)*

New WiCell Repository and Ongoing Support for UW Investigators

by Erik Forsberg

It is exciting to see the advances in stem cell research being made here on the UW campus! Many investigators are creating modified versions of the Wisconsin ES cell lines and new iPS cell lines that will be tremendously useful for researchers both here at the UW and around the globe. While most journals require that materials are available at the time of publication, we know that distribution of cell lines is a time-consuming task that can tie up valuable resources. Depositing your cell lines in the WiCell Repository will ease the burden associated with distribution, and allow your focus to remain on research.

The WiCell Repository will assist you by providing the following:

* Efficient global distribution of your cell lines
* Assured quality of distributed cells
* MTA management
* Technical support to researchers using your cell lines
* Continued availability through the WISC Bank

While outside investigators pay a $500 fee, depositing a cell line into the repository is free for UW researchers. If you are interested in depositing a cell line with WiCell, please contact Tenneille Ludwig.

WiCell is now offering Comparative Genomic Hybridization (CGH) plus Single Nucleotide Polymorphism (SNP) Microarray analysis, in addition to their host of other cytogenetic tests. Unlike previous assays that required performing CGH and SNP separately, this high-resolution array detects copy number changes by both SNP and CGH, while simultaneously delivering copy neutral change information, such as loss of heterozygosity (LOH). WiCell is the only lab that has an extensive CGH database to use for comparing profiles against both highly utilized hES cell lines and novel iPS cell lines. Go to http://www.wicell.org/home/cytogenetic-services/cytogenetic-services.cmsx or contact Karen Montgomery and her team at cytogenetics@wicell.org to learn more.

Don't forget about WiCell's ongoing support of UW investigators:

* Qualified Critical Reagents (media, growth factors, MEFs, etc.)
* Cell Lines (hES & iPS cells, cGMP grade human ES cells, modified human ES cells)
* Testing Services (routine mycoplasma testing and teratoma formation)
* Grant Application Support
* Laboratory Space
* Technical Support

…and MORE!

Contact Tenneille Ludwig (tludwig@wicell.org) [link to email] for more information.

Cell and Regenerative Biology News

Many SCRMC members, colleagues and students have reported their news and awards on the new Department of Cell & Regenerative Biology website. Check it out!

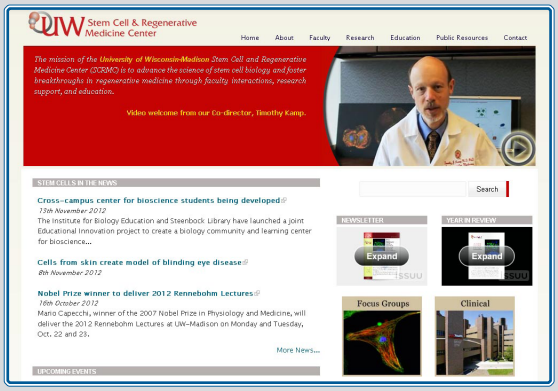
ADMINISTRAVIE NEWS

SCRMC Member Services

The following core services are available to SCRMC members and appear on our website at https://stemcells.wisc.edu/facilities/.

- Cellular and Molecular Imaging Services
- Immunology and Pathology Services
- Nonhuman Primate Services
- Induced Plurpotent Stem Cells Service
- Small Animal Imaging Services
- WiCell
- Research Materials and Services

...and much more!



*Our new, interactive **website** is up and running. **Remember:** You can help keep the site up-to-date by sending **Sue Gilbert** updates for your webpages and **job opportunities**.*

Stem Cell & Regenerative Medicine Center
UNIVERSITY OF WISCONSIN–MADISON

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Questions about this newsletter? Please contact us

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