Aftermath

From the Chair
Aaron Bertram

As we embark upon another academic year, and I embark upon another term as your chairman, I'd like to call your attention to some new developments and also to ask for your assistance. First of all, I want to thank three of our colleagues for their exemplary service to the department. Jingyi Zhu is passing the mantle of Director of Graduate Studies to Andrejs Treibergs. Thank you, Jingyi, for your critical role in helping us to find and retain our terrific cohort of graduate students. And thank you for representing the interests of our department in the Graduate School. Ken Golden is handing off the duties of Director of Undergraduate Studies to Nick Korevaar. Thank you, Ken, for your dedication to our REU program and your leadership as we embark upon our substantial revision of the undergraduate program. And last but certainly not least, thank you, Aleksandra Jovanovic-Hacon for your tireless work on behalf of our department and our students in the demanding role of Undergraduate Advisor. Kelly MacArthur has graciously agreed to take on that vital job for the department. Nat and I look forward to working closely with Andrejs, Nick and Kelly on behalf of our students.

There have been several changes to our undergraduate curriculum effective this Fall. Our Math 1010 (Intermediate Algebra) and Math 2250 (ODEs and Linear Algebra) each increased from three to four credit hours, and a new course, Math 2200 (Discrete Math) was added to the curriculum. This latter course is an elective for all math majors but is required of our math education majors. In addition, Cyndi Bestvina restarted our online Math 1010, which Peter Alfeld built and ran for several years. This, together with the online Calculus courses (Math 1210, 1220 and 2210) built by Hugo Rossi and currently run by Bob Palais, comprise our online course offerings.

On the graduate front, our VIGRE program will be reviewed sometime this year. At stake is the last two years of funding for the grant. Since the report last year from our advisory panel was very positive, the VIGRE committee is cautiously optimistic about the upcoming review, but we will, of course, need to take this very seriously.

After one term as chair, I have grown to appreciate with some awe just how large an operation we are running here. Excellence of our mathematics research and graduate program is, of course, one important aspect of our department, and by all measures, we run one of the top programs in the country. Excellence in teaching at the undergraduate level (both of our majors and our service courses) is another extremely important role that we play, and here too, I think that we offer extremely high quality teaching (though we don't get the appreciation that we deserve). But there are other strategic challenges that we face as a department. University funding requires us to compete with other departments, as well as continuing education, for students, who are in turn influenced by many different factors. Our client departments, notably Engineering, are concerned about the quality and relevance of our instruction. Developments, some good and some not so good, in mathematics instruction at the K-12 level need to be monitored, and our department needs to play a leadership role in the education of future teachers. To top it all off, we are increasingly being asked to find ways to raise money in the form of donations to the department.

We have committees that are assigned each year to address some of these issues, but I ask each of our faculty to consider whether, on behalf of the department, you would be willing to spend a couple of hours once a month to get informed about one of these aspects of the department's mission, and to assist me and the relevant committees as we set about finding strategies to help us continue to thrive as a community. We could use the help.

Welcome!

We'd like to extend a warm welcome to those who are new in the department this year, and we hope they feel at home here.

Our new postdocs and research associates are Bacim Alali (Partial Differential Equations), Daniel Conus (Probability Theory, coming in January), Jimmy Dillies (Algebraic Geometry),

Milena Hering (Algebraic Geometry), Peter Kim (Biology), Enkeleida Lakuriqi (Algebraic Geometry), Remi Lodh (Algebraic Geometry), Emanuele Macri (Stability Conditions), Daniel Onofrei (Partial Differential Equations), Spencer Stirling (Math/Physics), Lingxing Yao (Numerical Analysis), and Mark Zajac (Math Biology).

Our new graduate students are Julie Billings, Tim Carstens, Chih-Chieh Chen, Parker Childs, Rebecca Clover, Laura Czarnecki, Sita Gakkhar, Carlos Gamez, Alexander Heitman, Xiaodong Jiang, Brendan Kelly, Predrag Krtolica, Phi Long Le, Megan Morris, Stephen Odom, Feng Qu, David Quarfoot, Ron Reeder, Zachary Schaub, Mami Tonoe, Zhu Wang, Cheryl Zapata, Spencer Bagley, Megan Gorringe, Hilary Goss, Nick Humphreys, Cesar Lozano, Robert Proctor, Chia Chen Teng, Federico Urquijo-Ibarrola, and Amy Zahller.

Faculty Awards
Hormann Receives Laha Award
Andrejs Treibergs
Siegfried Hormann is one of eight young statisticians to receive the 2008 Laha Award, given by the Institute of Mathematical Statistics. The award is given for the best research papers in the world produced by graduating students or new researchers within two years of their Ph.D. The prize is an invitation to present the paper and travel funds to the 7th World Congress in Probability and Statistics, which was held this year in Singapore, July 14-19, 2008. This is a joint meeting of the American Statistical Association, Institute of Mathematical Statistics, The International Biometric Society and The Bernoulli Society, whose total membership is about five times that of the AMS and AMA.

Siegfried's winning paper, "Augmented GARCH sequences: dependence, structure and asymptotics" was presented in the session on Time Series. The award is named for Radha Laha (1930-1999) of Bowling Green University, who studied analysis and statistics, specializing in Characteristic Theorems.

Cherkaev Receives CDS Award
Kudos to Andrej Cherkaev who was recognized at the Center for Disability Students annual awards ceremony last April for being an outstanding faculty member to work with. He was nominated by Predrag Krtolica, who has this say about him:

"Andrej has been instrumental in my academic success ever since I first took his class in 2004. He approached me with a project assignment in the summer of 2005 which slowly motivated me to eventually come back to the U in my pursuit of a Ph.D. He was also the main figure in persuading CDS to buy a laptop for me which will allow me to teach in the future (hopefully next semester). Likewise, thanks to his persistence and belief in me I received a stipend, without which I don't think I would continue my dream towards the Ph.D. All in all I believe Andrej is not just a brilliant mind, but an outstanding human being too."

The CDS staff has also expressed how great Andrej is to work with. Way to go Andrej!

Staff Service Awards
Mary Levine, Angie Gardiner, and Kathleen Moore have been recognized for 25, 10, and 5 years of service to the university.

Mary began working for the university in 1983 with the Department of Social Work. She also worked for the School of Medicine (OB/GYN), and has been with the Mathematics Department since 1998, first serving as the Graduate Program Coordinator and then as Assistant to the Chair since December 2005.

Angie worked for the College of Science Dean's Office in 1996-1997, then spent a year at Salt Lake Community College before returning to the University in 1998. She's been working for the Math Department ever since.

Kathleen officially joined the Math Department in 2003 as an executive secretary, although she had previously worked as a grader while she was a student. She later became the VIGRE Coordinator and currently administers the VIGRE, IGERT, and RTG grants.

Summer Reports
Summer Mathematics Program for High School Students
Henryk Hecht
Henryk Hecht directed the Summer Mathematics Program for High School Students this year. He was assisted by students Matt Housley and Andy Thaler. Sixteen high school students participated, fourteen from Utah and two from Florida. Angie Gardiner took care, as always, of the logistics, making sure that "things ran smoothly."

The participants learned mostly about various areas of number theory including also elements of cryptography. They applied their mathematical knowledge through Python programing in afternoon computer labs. Students were also exposed to other areas of mathematics thanks to the daily colloquia given by members of the

department: Fred Adler, Peter Alfeld, Dennis Allison, Aaron Bertram, David Dobson, Stewart Ethier, Ken Golden, Jim Keener, Peter Trapa, Aaron Wood and Kevin Wortman .

At the end of the program, students had the opportunity to give their own talks on various science topics of their choice. On the last day, there was an informal exam in the form of a game of Jeopardy.

The enthusiasm of this group of participants was remarkable. It was amazing how quickly those high school kids absorbed sophisticated ideas of mathematics. It was them who made the program a success.

Coarse Differentiation Minicourse
Kevin Wortman
A two week mini-course for graduate students from around the country was hosted by our department from July 28 to August 8. There were about 10 participants who attended the mini-course to learn about a new technique in geometric group theory called *coarse differentiation.* This technique was developed by Eskin-Fisher-Whyte to settle an important conjecture in geometric group theory about the geometry of finitely generated, solvable groups.

As part of the mini-course, David Fisher (Indiana Univ.), Kevin Whyte (UIC), Irine Peng, (Indiana Univ.), and Tullia Dymarz (Yale) lectured on their intellectual contributions to the subject.

The conference was immediately followed by a two day Wasatch Topology Conference. We had five speakers come to Utah to tell us about their research: Danny Calegari (CalTech), Moon Duchin (UC Davis), Jeremy Kahn (Stony Brook), Martin Kassabov (Cornell), and Dongping Zhuang (CalTech).

Cancer Immunology Workshop
Fred Adler
The Research Training Group in Mathematical Biology hosted a Mathematical Perspective on Cancer Immunology workshop May 5 – 7, 2008.

This workshop brought together a broad range of mathematical biology trainees and researchers, with interests ranging from immunology, physiology, biophysics and evolutionary biology to develop a framework for synthetic research on cancer immunology. The principal speakers were Dominik Wodarz (University of California at Irvine), Baltazar Aguda (Boston University) and Peter Lee (Stanford University). Attendees included several other outside visitors, and nearly 20 members of the mathematical biology community.

This topic was chosen as lying at the interface of two areas of emerging interest in mathematical biology, in which no one individual was expert. The basic question is about the role of the immune system in preventing and controlling cancer, with the ultimate goal of understanding how the immune response can be used to specifically target cancer cells. The workshop mixed lectures by the experts, and small group sessions to work on mathematical modeling problems that emerged from the discussions. With the addition of Peter Kim (a collaborator of Peter Lee at Stanford) as a postdoctoral associate of the Research Training Group, our group is ready to apply past studies in physiology, evolution, and virology to this emerging area.

Geometry Workshop for Teachers
Emina Alibegovic
Nineteen teachers from around the state spent a week doing geometry problems and discussing their practice of teaching it. We started each day with a session modeled on Teachers' Circle that we run throughout the year: teachers were given a list of problems and they chose which ones to work on in their groups. Sometimes a group would solve just one of the problems, but most often they would do several. We were hoping that their personal preferences would ensure that all the problems would be solved at the end of the day, so that we could share and show the solutions to majority of problems. While the groups often attempted different problems, some were challenging enough that they remained unsolved, although not for the lack of trying. This portion did not end the mathematics component of the workshop. We had a pleasure of hearing Kevin Wortman, Mladen Bestvina, Elena Marchisotto (CSU Northridge), and Dennis Allison give talks on topics ranging from the geometry of salt piles to what wind has to do with the shape of a surface. Our visitor, Elena

Marchisotto, also gave a series of talks about use of literature in the mathematics classroom and provided our participants with an extended list of articles that they might find useful for their personal and their students' mathematical growth.

Teachers told us that, as much as they enjoyed learning from our professors, they enjoyed learning from each other. We reserved a portion of each day for teachers to share their teaching ideas with one another. They shared lesson plans, problems, games and puzzles. They spent part of the day working with each other, making lesson plans that they simulated and shared at the end of the workshop.

Reflecting on practice is an important part of the teaching profession and to encourage it in our participants we asked Patricio Herbst from the University of Michigan to participate in our workshop. To encourage teachers to reflect on their practice his research group has developed a series of animations that describe classroom episodes. The goal of these is to spark conversations and reflections about one's own teaching, and they have been successful with our group.

We were excited to learn that teachers enjoyed the workshop and the community we created during that time. Our hope is that they will continue to collaborate through the wiki page we have set up for the workshop, and through other activities we will continue to organize. Many have expressed a desire to be participants in our future workshops, and several will be joining us in our regular Teachers' Circle sessions.

Summer REU
Aaron Bertram
June 16 – July 3 were the dates of this summer's REU in Computational Algebraic Geometry. Aaron Bertram directed the REU with the able assistance of Rob Easton, Sarah Kitchen, and Dylan Zwick. The REU differed from previous ones in several important ways. With 18 of the 20 students coming from out of state, we addressed a concern of our VIGRE advisory committee. And with those 18 students going on to the Undergraduate Summer School at the Park City Mathematics Institute, we finally achieved the linkage of the two programs after several years of effort.

The enthusiasm of the students was almost overwhelming. Our original intent was to go through the book of Cox, Little and O'Shea on Ideals, Varieties and Algorithms, and we did indeed get through the book, together with some extensive Maple problem-solving and programming (led by Dylan) and student projects.

But many of the students hungered for more. So in addition to tag-teaming a series of lectures guided by the book, Sarah led sessions on the infamous Hartshorne exercises, Rob gave some entertaining "Grothendieckian" lectures, Dylan talked robotics, and Aaron attempted a comprehensive overview of algebraic geometry in several hyperactive lectures. Great fun was had by all, and we just might have recruited some future graduate students. We are looking forward to next year's REU to similarly link with the Park City program in Number Theory. Gordan Savin will be in charge of the festivities next year.