Call To Order: 12:04 p.m.

Communication Officer’s Report - Approved Minutes of 4/16/2015: https://ritdml.rit.edu/handle/1850/17465
[If you experience any difficulty with the DML links, please email the DML department at: ritscholarworks@rit.edu.]

Executive Committee Report - None

Executive Committee Elections

- Michael Laver opened the floor for any more nominations or self-nominations for the Executive Committee elections taking place today. No other nominations were made.
- Election results are as follows and congratulations was expressed to the newly elected Academic Senate Executive Committee.
  
  Chair: Hossein Shahmohamad (COS)
  Vice Chair: Eli Saber (KGCOE)
  Operations Officer: Larry Villasmil (CAST)
  Communications Officer: Clyde Hull (SCB)
  Treasurer: Hamad Ghazle (CHST)

- “Thank you” was extended to Vincent Serravallo, chair of the Nominations Committee for running these elections.

Proposed PhD in Mathematical Modeling

PPt Presentation and Additional Letter of Support: https://ritdml.rit.edu/handle/1850/17467

- The PhD degree program proposal returned to senate today for further discussion and vote.
- Discussion ensued of whether or not there should be a closed ballot for the vote on the PhD in Mathematical Modeling. M. Laver asked if there are any objections to this, as some members had requested this.
  o M. Kotlarchyk: I oppose having a closed ballot.
  o H. Ghazle: For transparency, I would prefer that the vote not be a closed ballot, and vote in the proper fashion as we always do, as this would be beneficial.
  o G. Hintz: I move that we proceed and vote for having a closed ballot.
  o H. Shahmohamad: I second this motion. He then asked to read the following paragraph send from Dr. Michael Laver on October 15, 2015. Michael Laver approved for him to read this email he had sent.
    “….Secret ballots are used to protect those who feel that they have something to lose by having their vote be public, and so it is the right of any member to move for a secret ballot. If I were head of a body, however, I would strive to ensure that everyone felt comfortable voting…..”
S. Maggelakis: Why should we follow this procedure for this program and we have not followed it for other programs?

- M. Laver: Because it has been requested by some members and any program that comes to senate has the right for either an open or closed ballot, depending on what the senate as a whole wishes to do.

J. Goldowitz: Being on senate for a long time, I cannot recall a closed ballot like this before. We must evaluate this program on the merits, and we must have the best interest of our students at heart. If the upper administration has stated their support for the program to be approved, then I can well see why this is being requested to have a closed ballot, as it may cause some people discomfort voting the way they feel with the administration being present.

Motion to have a closed ballot for the vote on the proposed PhD in Mathematical Modeling passes with 17 in favor, 6 opposed and 7 abstentions.

- Due to the many questions raised and comments made regarding the proposed PhD, Nathan Cahill, Associate Professor in SMS and Joseph Hornak, Graduate Council Chair were present to answer any questions and to help lead the discussion.
- A power point was presented by Nathan Cahill to bring clarification and amplifications of the proposal, along with one more letter of approval that was mentioned in senate.
- This program is not a classical or traditional PhD in Mathematics (like the UR PhD Math program, for example). It is unique and innovative, and provides training that classical Mathematics PhD programs do not. External reviewers stated that this program "will be the first of its kind nationally" and "will serve as a model for a disciplinary based program with strong interdisciplinary ties."
- This program is firmly rooted in applied mathematics. Six of our peer institutions have PhD Programs in Applied Mathematics (including Applied Math, Computational Math, and Atmospheric Oceanic Science and Math); 6 out of 6 require or strongly encourage courses outside of the math department; 0 out of 6 require traditional pure mathematics courses like Analysis, Algebra, and Topology.
- This program has gone through a thorough review at many levels. The official positions of SMS, COS, and Graduate Council, as reflected in the votes, are that they are all in support of this proposal. The proposal was reviewed by multiple academic and industrial professionals. Academic reviewers had very substantial experience, including Dr. John Pelesko (the Director of the Graduate Program in Interdisciplinary Applied Mathematics at Virginia Tech, and former Vice President for Education for the Society of Industrial and Applied Mathematics), Dr. Avner Friedman (the Director of the Institute for Mathematics and Its Applications, Director of the Mathematical Biosciences Institute, and Member of the National Academy of Sciences), and Dr. Peter Turner (Dean of Arts & Sciences at Clarkson University, former Chair of Mathematics and Computer Science, and Vice President for Education for SIAM).
- The case study of a hypothetical student “Alice” who applies to our program and would like to focus on mathematical modeling in finance was shared.
- Our program prepares students in math modeling, numerical analysis and high-performance computing, as well as foundational concentration courses and various electives; this preparation is different from and cannot be attained by any other RIT PhD Program. Our program will enrich RIT’s learning environment and will complement other PhD Programs.
- We will have positive impact on undergraduates. Inclusion of a PhD Program in SMS lays the groundwork to show undergraduates there is a clear path to advanced studies. Vertical growth of research labs enables many more possibilities for rich and inspiring undergraduate research experiences, dovetailing nicely with the requirement for all COS undergraduates to do experiential learning before they graduate.
- PhD Students will be supported by RIT funds for first year stipends. Students in subsequent years will receive stipends via external grants or teaching assistantships (TAs). TAs will hold Calculus workshops. Calculus courses currently meet for 4 lecture hours and 2 workshop hours per week. Lectures will be taught by the faculty member. TAs will attend mandatory training and meet with the instructor before each Calculus workshop.
- We would like to be able to give PhD students who wish to pursue careers in academia the opportunity to participate in an Instructor Training Program. We would also like to offer them the chance to teach a low-level course (e.g., Algebra, College Algebra) if they have a MS degree and are viewed to be qualified. We studied and wanted to emulate successful training programs for PhD students that include classroom
training (Ohio State, U. Indiana, U.C. Berkeley, MIT, Brown, NCSU). Yet, RIT may not be ready for this step. The Office of Graduate studies is developing a centralized model of TA training at RIT at the Institute level; we are ready to wait to implement this aspect of our TA model until OGS has formally adopted such a model.

- This PhD Program will grow the reputation of our School, and in turn, grow the reputation of RIT. Currently, the American Mathematical Society groups RIT in the same category as many SUNY schools based on having no PhD Program in our School. As in other RIT schools with PhD Programs, our PhD Program will help attract excellent undergraduates to RIT. In addition, it will help attract excellent faculty to RIT who would not otherwise consider us as a viable place to work. Our program will increase opportunities for interdisciplinary growth and external funding at RIT. Our core courses provide skills that are attractive to many other PhD Programs at RIT.
- We are very proud to present this proposed PhD in Mathematical Modeling.

Discussion/Q&A ensued.

- M. Laver: I am very impressed with the level of civil discussion that has been going forth on email. Additionally, Roberts Rules will be followed very strictly in today’s discussion.
- E. Saber: Could you please return to the case study slide on Alice. I could argue that this hypothetical student could apply to several other PhD programs that already exist. The only one exception may be Finance. In other words, this is redundant across certain existing graduate domains. Why can’t we do this under the already existing PhD in Engineering? Or why not call the program a PhD in Mathematics?
  - N. Cahill: We have a strong Mathematical Modeling component and the research is on how mathematical modeling can be used to solve real world problems. The curriculum in the other PhD programs does not provide them with the preparation they would need to solve certain problems.
- L. Buckley: This discussion is very helpful. I see this program as a way to strengthen our life sciences program. We already are strong in the physical/engineering sciences, but I would like to note that modeling is at the core of many new fields within the life sciences. There are entire biosciences and other biological subfields that need mathematical modeling.
- J. Ettlie: With respect to teaching and the TA questions, I think that the economic justification will largely depend on the size of the cohorts and the pacing of them through the program. PhD programs are extremely labor intensive to the faculty, and how many students will we be accepting into the program?
  - N. Cahill: We will accept five students per year.
- H. Flores, Graduate Studies Dean referred to the slide on TA’s and clarified that the OGS is in the process of developing a collaborative model for TA training while respecting the autonomy of the individual programs regarding actual program content.
- W. McKinzie: This reminds me of computing in the 1960s. When such programs were being formed, everyone was asking why? Question: Is mathematical modeling a CORE discipline?
  - N. Cahill: This reminds me of my graduate experience at Oxford and I think your point is well taken. This program could widely impact many other areas that already exist and we are very well poised.
- S.M. Ramkumar: Going back to the hypothetical case study slide, what was Alice’s undergraduate degree and what led her to apply to your program?
  - N. Cahill: She could have had a background in pure mathematics or computational finance. She could have also taken some finance courses and might now want to go into more depth.
  - S.M. Ramkumar: I would suggest you have letters of support from such disciplines, and I feel that would strengthen your proposal.
  - N. Cahill: We could do this.
- H. Shahmohamad: I want to thank the Provost for guiding us. I have faith in him and know how invested he is in this issue. We are committed to shared governance and discussions such as this today are very important and what our campus needs. Four years ago SMS stopped hiring traditional, classical mathematicians and started hiring physicists. May I remind you of the fact that our new strategic plan has just been written and that most strategic plans are aspirational and rarely meet their goals? Shouldn’t we pause and think about this instead of acting so swiftly? I question the program’s rigor, whether the students you claim are waiting to enter this program actually exist, its funding model, as well as your external letters of evaluation. The Executive Committee should get feedback from the PhD Directors from these schools, providing a questionnaire for them to fill out.
I move that the Executive Committee of the Academic Senate seek letters from five of the Peer Universities listed (a document was distributed listing Peer Universities that had not been contacted in regards to this proposed program) and until a response is received, that we table this proposal. This motion is seconded by L. Villasmil.

- S.M. Ramkumar: We need to be careful in what we ask of them. We need to be sure that we ask about its academic quality and then bracket out financial considerations.
- M. Fluet: It is not up to the senate to see if this program is financially sound, so financial considerations are not appropriate.
- C. Collison: I put my trust and confidence in those who reviewed this program and we should support it. I disagree with seeking any further review of this proposal. I have faith in the process and think it has been fair and reasonable. This body has the ability to make a decision regarding this program, and I support it for academic reasons.
- H. Ghazle: This reminds me of political elections and each is trying to present their own argument. Is there a way to work out the differences and commonalities, as surely this proposal has some merits. Can we form a group from both sides of the table to work things out?
  - N. Cahill: There were eight different faculty meetings in our School and all faculty were encouraged to participate and give feedback during the time of drafting this program proposal. Many of the traditionally trained mathematicians from SMS have been fully involved in the work on this program proposal.
  - Provost: I had the pleasure of speaking with the external reviewers when they were on campus. I had many of the concerns, as well, that have been expressed at today’s meeting regarding rigor and whether the graduates would be able to apply the modeling. I was blown away by the positive support and excitement from the reviewers with respect to how innovative and robust the program was. That review was in-and-of itself a very compelling argument and I saw that we had strong external validation from academia. You would not have seen this in the proposal, but I was privy to it in my face-to-face discussions. Hossein, you and I are pure mathematicians and there will come a time when I will come to your department and will be working side by side learning your wonderful teaching and research techniques. In my role I must encourage these very creative programs that are coming out of the faculty. This is what we do at RIT in charting out new territory and it is done exceptionally well. The PhD being presented today is a great example of an excellent program.
- G. Hintz: It seems to be that we do not have the authority to ask for this (seeking letters from the Peer Universities).
- J. Ettlie: This is a strange list of peer universities, in my opinion, as I never saw Clarkson nor MIT on this list. If we again table this proposed PhD program that would not be good.

Motion to table the proposal until further external validation is sought does not pass.

- G. Hintz: What are the consequences if this program fails?
  - N. Cahill: If any PhD program fails it would be a hit to the reputation of the University. In our PhD proposal we have many faculty involved and many different concentrations and application domains. The risk of the program failing is mitigated by the five different application domains included in this proposal. You could ask this about any PhD Program I believe.
- S. Ramkumar: Do you have letters of support from other PhD programs that currently exist as this will strengthen what you are trying to propose? You are going to draw on resources from each of them, given the interdisciplinary nature of the proposal.
  - N. Cahill: A number of months ago we asked all PhD Program directors and Deans. We mostly received verbal responses, and we received letters from Imaging Science and Astrophysical Sciences & Technology. After the last Senate meeting, we received a formal support letter from Professor Pengcheng Shi from GCCIS. This support letter can be viewed via this link: https://ritdml.rit.edu/handle/1850/17467
- S. Hoi: This program is very unique. The industrially focused mathematical modeling program at Oxford strikes me as possibly similar. Yet, in Oxford this is a 4-year program that requires a Master’s and a 3.6 GPA. The RIT
program that you are proposing is a 3-year program and we do not have as stringent a GPA requirement. There is no way that this program would compete with them.

- N. Cahill: It is a bit different in the UK system and doctorates are typically research based. In the U.S. there are some of the courses in the PhD program that Oxford would have in their Master’s program. Our PhD program will gain a reputation as it matures, and eventually it will have a very strong reputation.

- W. McKinzie: If a student applied to this program and said that they wanted a degree in Mathematical Modeling, but are uncertain of the application domain or field, would they get admitted into the program and how would you handle this? A core of computing is computing in and of itself, and not attempting to apply it.

- N. Cahill: Eventually they are going to have to declare a concentration and I would want to reach out to them and attempt to discern what this might be. If they had a strong background in mathematics, they will still need to do much research. We don’t want to set up someone to fail.

- R. Raffaelle: There is risk involved for any programs, yet these programs will evolve over time. This program was reviewed in the Board of Trustees sub-committee for research and was resoundingly endorsed. They saw it as an emerging discipline.

- L. Buckley: One of the goals of the Strategic Plan is to have a higher profile in the Life Sciences, especially STEM, and this would be a way to achieve this in my opinion.

- L. Villasmil: My background is fluid mechanics, so I am very excited about modeling. My concern is the rigor of the program and a stronger sequence should be a part of this program.

- N. Cahill: Our possible concentrations, which I shared in my presentation two weeks ago, have various foundational courses that address these concerns.

- H. Ghazle: The discussion has been very thorough and now it is time to vote.

**Question is called to vote on the PhD in Mathematical Modeling. Discussion continues as there was not a 2/3 majority approving this.**

- J. Capps: I believe one of Hossein’s concerns is that of students being admitted to this program who lack a foundation in pure mathematics, and will be doing modeling and applied mathematics, yet they will never obtain this pure foundation. Is that a fair characterization of your view? And how do our proposed admissions requirements compare with other comparable programs?

  - N. Cahill: Mathematical Sciences is a very broad domain that includes pure mathematicians, applied mathematicians, computational mathematicians, and mathematical modelers. There is room for all of these groups. Our peer institutions who offer applied mathematics PhD programs do not require foundational courses in pure mathematics. We have to trust the admissions committee’s wisdom.

- Dr. Hector Flores, Graduate Studies Dean made some reflective comments regarding this program proposal.

  - I have worked collaboratively with all the PhD program directors over the past four years.
  - If this proposal passes, I am confident that the PhD directors will welcome this new program and do their best to make it successful.
  - The Provost and I are 150% committed to the highest standards of quality.
  - I will do everything in my purview to work with Dean Maggelakis, the School of Mathematical Sciences, and the Provost to ensure the excellence and success of this program.

- H. Ghoneim: What does it take to move a Division 3 team to become a Division 1 team? I just want us to reflect on this question.

**Vote to approve the PhD Program in Mathematical Modeling passes with 26 in favor, 6 opposed and 3 abstentions.**

**Proposed Policy E24.0 (Faculty Grievance)**

Proposed E24.0 document, Current Policy and PPt:  [https://ritdml.rit.edu/handle/1850/17460](https://ritdml.rit.edu/handle/1850/17460)

This agenda item was deferred due to time constraints and will return to senate at the next meeting on May 7, 2015.

Adjournment: 1:52 p.m.
Respectfully Submitted,
Chip Sheffield, Communications Officer
Vivian Gifford, Senior Staff Assistant