Mathematical body weight regulation models from bench to bedside: Navigating translational research

A Mathematician's Perspective

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- What is Translational Research?
- Team formation
- Publications
- Conferences
- Funding
- Tenure, Promotion, Institutional Advancement



What is Translation Research?

- To improve human health, scientific discoveries must be translated into practical applications
- Such discoveries typically begin at "the bench"
 with basic research in which scientists study
 disease at a molecular or cellular level then
 progress to the clinical level, or the patient's
 "bedside"
- -NIH Roadmap



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Ingredients for a solid translational team

Team Formation

Team ingredients that foster modeling from the bench to the patients bedside:

- Mathematician
- Physiologist, Nutrition Expert
- Clinician
- Director of a research program
- Computer Programmer (java)

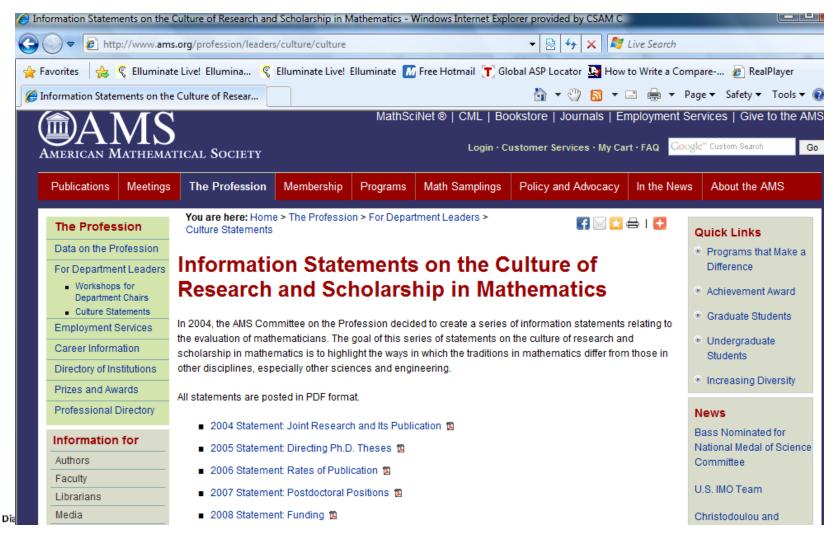


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How does the publishing culture differ?

Publications





Where should I publish?

Publications

Math Journals

Pros

Experience

Cons

Application,
 Slow, Lack of
 Impact in
 medical field

Biomed Journals

High Impact,
 Fast

Structured, Fast



Can we publish mathematics in biomed journals?

Publications

Background: Energy intake (EI) during weight loss is difficult and

To publish in biomed journals you need to:

- 1. Make research relevant to medical applications.
- 2. Demonstrate that your model "works" and detail the limitations.
- 3. There are items reviewers are looking for-don't take your own route.

limits.

Conclusion: The validity of the newly developed EI model was

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Presentations at Math Conferences

Conferences

A one hour presentation where...

- The general audience should understand 10 minutes of your talk
- Your talk should include a proof or major simulation

Presentations at Non-math Conferences

Conferences

A one hour presentation where...

- The audience should understand most of your talk
- The presentation is structured by Purpose, Methods, Results, and Conclusion
- There is reduced amount of formulas and equations
- There is inclusion of answers to questions such as: Does it work? Is it clinically applicable? How can a non-mathematician access the model?

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Is funding affected by culture?

Funding

- Mathematicians are usually funded by NSF for small amounts of money
- Most mathematicians are not funded
- Proposal writing is considered extraneous to scholarship

Do I take time away from publishing to write a proposal which has a low probability of getting funded and does not give me "time"?

SMB Survey Results

"My impression is that the NIH funding is not geared for biomathematics."



Why seek funding?

Funding

Obvious Reasons

- Less pre-calc more research time
- Obtain computing equipment, travel money, student help

Less Obvious Reasons

- Page Costs
- Site visits
- Student training
- Payment for your collaborators time
- Ability to conduct your dream clinical trial

Tips for applying for federal funding

Funding

- Search NIH site for guidance Video of a mock study section reviewing proposals
- Read books: Research Proposals, Third Edition: A Guide to Success Thomas E. Ogden
- Read proposal summaries on NIH Reporter
- Talk to successfully funded colleagues in mathematics (Evelyn Sander) and your translational research team for advice
- Read successful grant proposals!!
- Use Adobe Read Out Loud feature



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Crossing departmental silos

Tenure, Promotion, Institutional Advancement

- Obtain support from your chair and dean
- Forge relationships across campus (Cross-Disciplinary classes, collaborative studies, sharing students)
- Apply for every possible university-wide internal funding mechanism
- Talk often to your chair and your dean to make sure they know the unique challenges you face
- Maintain your relationships with departmental colleagues

Thank you to my collaborators!

Questions????

