College of Natural Science

College Faculty Meeting and Awards Ceremony

AGENDA

Friday, November 11, 2016
3:00 pm – 4:00 pm
1200 Molecular Plant Science Building

Items:

1) Approval of Agenda for November 11, 2016
2) Approval of Minutes from November 20, 2015
3) State of the College—Jim Kirkpatrick
4) Other Business
5) Awards Ceremony

Attachment:
Report of NatSci Standing Committees
State of the College

November 11, 2016
MSU’s Empower Extraordinary Capital Campaign

- Multi-year project – Began in 2011, continues until 2018.
- October 2014 – Launched of “public phase” of campaign.
- Overall MSU goal: $1.5 billion – As of 11/03/16, university wide the campaign has raised $1.3 billion (86.33% of goal).
Empower Extraordinary
College of Natural Science

- NatSci goal: $74 million
- $54.68 million raised to date (73.85% of goal)
- Raised $16.5M in 2015-2016.
- We have added 6 new endowed faculty positions and 11 new endowments.
- Four main campaign priorities/targets:
  - Engine of Opportunity – student support (60.39% of goal)
  - Creativity, Discovery, Learning – endowed positions (53.52% of goal)
  - Global Problem Solver – research (217.52% of goal)
  - Building a Vibrant Community – facilities (119.57% of goal)
<table>
<thead>
<tr>
<th>Category</th>
<th>Fall 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSU overall</td>
<td>50,344</td>
</tr>
<tr>
<td>(undergrads)</td>
<td>38,410</td>
</tr>
<tr>
<td>MSU/NatSci Fall 2016 undergraduate majors</td>
<td>5,268</td>
</tr>
<tr>
<td>(plus 912 LBC coordinate majors)</td>
<td></td>
</tr>
<tr>
<td>MSU/NatSci Fall 2016 incoming freshmen</td>
<td>1,360</td>
</tr>
<tr>
<td>MSU/NatSci Fall 2016 graduate students</td>
<td>918</td>
</tr>
</tbody>
</table>
NatSci 2016-17 Budget

Total Recurring Budget: $67.7M – up 5.0%
- $1.98M University allocation
- $1.85M Salary increases
- $-.65M 1% efficiency reduction

Total Non-Recurring Budget: $7.7M – down 9.0%
- $640k Program allocations (up $87k)
- $4.3 M Off-campus & online instruction (down $300k)
- $2.77M F&A (down $127k)
### Recurring University Allocation – $1.98M

<table>
<thead>
<tr>
<th>Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$845k</td>
<td>Establish CMSE</td>
</tr>
<tr>
<td>$455k</td>
<td>GII hires - salary</td>
</tr>
<tr>
<td>$220k</td>
<td>Biology Initiative</td>
</tr>
<tr>
<td>$235k</td>
<td>Chemistry transformation</td>
</tr>
<tr>
<td>$147k</td>
<td>Quantitative literacy</td>
</tr>
</tbody>
</table>

### Additional University Support – $11.268M

<table>
<thead>
<tr>
<th>Amount</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>$7.13M</td>
<td>Faculty start-up and retention</td>
</tr>
<tr>
<td>$2.09M</td>
<td>Research</td>
</tr>
<tr>
<td>$456k</td>
<td>Other instructional</td>
</tr>
<tr>
<td>$1.04M</td>
<td>Named/endowed professors</td>
</tr>
<tr>
<td>$522k</td>
<td>TLE and A+I</td>
</tr>
</tbody>
</table>
F&A Generated
00/01 through 15/16

(By NatSci Departments under all MAUs)
Department Leadership Changes

- Danny Schnell, Plant Biology chair

- Frederi G. Viens, Statistics and Probability chair
Dean’s Office Changes

New staff
- **Sara Ford**, alumni relations coordinator, Advancement Office
- **Susan Dyer**, receptionist, Dean’s Office
- **Shelby Gombosi**, administrative assistant, Academic Student Affairs
- **Inna McNamara**, research administrator, Office of Research Support
- **Kaitlin Peterson**, human biology advisor, Academic Student Affairs
- **Beth Reid**, office assistant, Academic Student Affairs
- **Kate Thome**, advisor, Academic Student Affairs
Dean’s Office Changes

Position Changes
- **Janae Currington**, assistant director of academic advising (replacing Heidi Purdy)
- **Danielle Lopez**, assistant director of student success
- **Ryan Ward**, director of IT (replacing Matt Stehouwer)

Departures
- **Sekhar Chivukula**, now MSU dean of undergraduate studies and associate provost.
- **Deb Dotterer**, MSU assistant dean of university advising as of Nov. 14.
- **R. James Kirkpatrick**, stepping down as dean in summer 2017.
New NatSci Faculty Members

Chemistry
- Liangliang Sun, assistant professor (analytical chemistry/mass spec)
- Gregory Severin, assistant professor (isotope chemist-FRIB)

Computational Mathematics, Science and Engineering (CMSE)
- Arjun Krishnan, assistant professor (data science)
- Michael Murillo, professor (scientific computing)
- Jianrong Wang, assistant professor (data science)
- Yuying Xie, assistant professor (statistical machine learning)
- Ming Yan, assistant professor (computational science/mathematics)
New NatSci Faculty Members (cont.)

IBIO/Ecology, Evolutionary Biology and Behavior (EEBB)
- Marjorie Weber, assistant professor (quantitative organismal biology)

Earth and Environmental Sciences
- Allen McNamara, endowed professor (computational geodynamics)

Mathematics
- Kristen Hendricks, assistant professor (topology)
- Ekaterina Merkurjev, assistant professor (data science/comp. math)
- Igor Rapinchuk, assistant professor (group theory)
Physics and Astronomy
- Alexei Bazavov, assistant professor (LQCD)
- Huey-Wen Lin, assistant professor (LQCD)
- Andreas von Maneuffel, assistant professor (PQCD)

Statistics and Probability
- Frederi Viens, professor and STT chair
The GII is having a very significant, positive impact on the development of MSU.

**Areas of focus include:**
- Plant genomics
- Plant resilience (new institute)
- CMSE: data science/scientific computing
- Nuclear physics: quantum chromodynamics
- Ultrafast science
- Mass spectrometry
- Antibiotic resistance
- STEM education
- Cancer biology
Early CAREER Award Winners

Amy Ralston – Biochemistry & Molecular Biology, 2016 (Presidential)
Lars Brudvig – Plant Biology, 2016 (NSF)
Sean Couch – Physics & Astronomy, 2016 (DOE)
Christopher Wrede – Physics & Astronomy, 2016 (DOE)

Yingda Cheng – Mathematics, 2015
Aaron Levin – Mathematics, 2014
Chris Waters – Microbiology, 2013
Matt Hedden – Mathematics, 2012
John McGuire – Physics, 2012
Teena Gerhardt – Mathematics, 2012
National and Int’l Award Winners

International Society of Photosynthesis Research Innovation Award:
   David Kramer, Hannah Distinguished Professor in photosynthesis and bioenergetics

Charles F. Kettering Award for Excellence in Photosynthetic Research:
   David Kramer, Hannah Distinguished Professor in photosynthesis and bioenergetics

Alfred P. Sloan Research Fellowship:
   Matthew Hirn, Computational Mathematics, Science and Engineering
   Kendall Mahn, Physics & Astronomy
American Association for the Advancement of Science (AAAS) Fellows:

Zachary Burton, Biochemistry and Molecular Biology

R. James Kirkpatrick, Chemistry and Earth & Environmental Sciences, NatSci Dean

G. Philip Robertson, Ecosystem Science, KBS

American Physical Society Fellows:

Megan Donahue, Physics & Astronomy

Brian O’Shea, Physics & Astronomy/CMSE

Royal Society of Chemistry Fellow:

James K. McCusker, Chemistry
National and Int’l Award Winners (cont.)

Simons Fellowship in Mathematics:
  Dapeng Zhan, Mathematics

American Chemical Society - Melville Wolfram Award:
  Xuefei Huang, Chemistry

American Physiological Society – Beverly Petterson Bishop Award:
  Brian Gulbransen, Physiology

American Society for Microbiology – Young Investigator Award:
  Kristen Parent, Biochemistry & Molecular Biology
DARPA Young Faculty Award:

Matthew Hirn, Mathematics

Marion Milligan Mason Award for Women in the Chemical Sciences:

Kristen Parent, Biochemistry & Molecular Biology

Association of Public Health Laboratories – Lifetime Achievement Award:

Frances Pouch Downes, Biomedical Laboratory Diagnostics
MSU Faculty and Staff Awards

MSU Foundation Professors:

Joey Huston, Physics and Astronomy

Christopher Klausmeier, Plant Biology, Kellogg Biological Station

Elena Litchman, Integrative Biology/Plant Biology, Kellogg Biological Station

Beronda Montgomery, Biochemistry & Molecular Biology/Microbiology & Molecular Genetics, Plant Research Laboratory

Michael Thomashow, Microbiology and Molecular Genetics/Plant, Soil and Microbial Sciences, Plant Research Laboratory
Rudolph Hugh Endowed Chair in Microbial Pathogens:  
Victor DiRita, chair, Microbiology & Molecular Genetics

Endowed Chair in Geodynamics:
Allen McNamara, Earth & Environmental Sciences

Jerry Cowen Chair in Experimental Physics:
Johannes Pollanen, Physics & Astronomy

John Hannah Distinguished Professor of Computational Chemistry
Angela Wilson, Chemistry
William J. Beal Outstanding Faculty Award:
- **Mitch Smith**, Chemistry
- **Mark Voit**, Physics & Astronomy/associate dean, undergraduate studies

Teacher-Scholar Award:
- **Lars Brudvig**, Plant Biology

Innovator of the Year Award:
- **Gemma Reguera**, Microbiology & Molecular Genetics

Innovation of the Year Award:
- **Bruno Basso**, Earth & Environmental Sciences
Increasing Student Success: Undergraduate Education

- Biology Initiative
- Chemistry (CLUE/beSocratic)
- Mathematical Sciences
- Introductory Physics
- Neuroscience
- Integrative Studies
The Biology Initiative has fundamentally changed the culture of undergraduate teaching and learning in biology across the college.

- **Recent Major Milestones:**
  - Hiring of course coordinators to help sustain the transformation of the primary life science gateway sequence (BS 161/162) and the foundational genetics course (ZOL 341).
  - Foundational courses – New 300-level physiology lab course; Micro 301/302.
  - Diversification of offerings in Introductory Biology to improve the learning experience for both biology majors and non-majors.
CLUE Curriculum for Chemistry

- **General Chemistry** – The gateway curriculum has been fully transformed over the last 2 years. Implementation of the CLUE curriculum has resulted in higher average grades for all students.

- **Organic Chemistry** – Melanie Cooper and colleagues were recently awarded an NSF grant to support a similar transformation of the organic chemistry sequence.

- **beSocratic** – Sustainable funding has been found for the beSocratic homework system, which is central to the CLUE curriculum.
Primary Objectives:

- Ensure that we do all we can to help all MSU students succeed in their initial math course.
- Provide the support necessary for underprepared students to succeed in mathematics – STEM and non-STEM students.
- Vertically integrate quantitative reasoning appropriate to each student’s discipline.
- Increase success of students from challenged backgrounds in STEM and at MSU overall.
Significant progress is being made toward these objectives:

- **Quantitative Literacy** – two QL courses (MTH 101 and 102) piloted and very successful; drop/fail rate less than half that of other math gateway courses.
- **Discipline-Focused Calculus** – MTH 124 redesigned to center on problem-solving for business/social science and life-science majors.
- **Calculus Sequence (Math 132, 133)**: Flipped classrooms, active learning labs, computation-based approaches.
- **Center for Instructional Mentoring** – New center to provide training and mentoring in support of active, problem-based learning across the mathematical sciences.
Mathematical Sciences
Current and Planned Projects (cont.)

- Continue development of QL courses: MTH 101 and 102.
- Integrate QL courses with Integrative Studies courses: co-registration.
- Pilot co-registration, supplementary instruction in beginning math courses to evaluate elimination of Math 1825.
- Develop more appropriate and more effective pre-calculus sequences.
- Revise introductory statistics courses and integrate better with calculus, other math courses and later courses using statistics, especially in biology.
- Continue development of calculus, linear algebra and differential equations sequence.
- Continue development of Center for Instructional Mentoring.
Focus on core physics ideas, cross-cutting concepts, and science practices:

- **Projects and Practices in Physics (P³)** – New model for PHY 183 (mechanics for physicists and engineers); emphasizes student work groups.

- **Physics at the Cellular Level (P@CL)** – Transforming PHY 231/232 for life-science majors by building on the P³ model; develop the interdisciplinary reasoning skills needed by biologists. Being piloted for one section of 35 students in AY16-17.

- **DATA Physics labs** – HHMI funding has supported development of pilot sections of a new format for the PHY 251 and 252 lab courses. Initiated in AY 15-16; SS17 - 16 transformed sections.
Neuroscience undergraduate major has rapidly grown to become the second largest in the college.

Originally planned for a steady-state level of ~400 majors, now > 560 and climbing.

Additional instructor for 2017-2018.

University-wide discussion of neuroscience research and education at all levels.
Key Grants

*National Science Foundation:*

- $4.4M to identify genes in the corn genome with the goal of breeding new, more nutritious corn varieties. (Dean DellaPenna, Robin Buell)
- $5.2M to develop new approaches to discovering plant chemicals and finding the genes plants use to make valuable molecules. (Rob Last, Cornelius Barry, Arthur Jones III, Shinhan Shiu)
- $972k major research implementation (MRI) award for the continued development of ultrafast electron microscope for probing energy material structures. (Chong-Yu Ruan, Phil Duxbury, Martin Berz, Steve Lund)
- $803k to further investigate the molecular mechanisms of the self organizing embryo. (Amy Ralston)
Key Grants (cont.)

American Association for Cancer Research – NextGen Grant:
- $450k to investigate metabolic pathways related to pancreatic cancer growth, ultimately leading to new treatment strategies. (Sophia Lunt)

U.S. Agency for International Development:
- $1.1 million to fight the Zika virus in Mexico. The funding will be used to build a mosquito factory in Yucatan. (Zhiyong Xi)
State of the College

November 11, 2016
College of Natural Science

Awards Presentation

2016-17
NatSci Outstanding Faculty Award 2016-17

James K. McCusker
Chemistry
NatSci Outstanding Faculty Award 2016-17

Richard C. Schwartz
Microbiology & Molecular Genetics/
College of Natural Science
NatSci Outstanding Faculty Award 2016-17

David Tomanek
Physics & Astronomy
NatSci Teacher-Scholar Award
2016-17

Gina Leinninger
Physiology
NatSci Teacher-Scholar Award 2016-17

Ping-Shou Zhong
Statistics & Probability
NatSci Undergraduate Teaching Award 2016-17

John Merrill
Microbiology & Molecular Genetics
NatSci Undergraduate Teaching Award 2016-17

Claire Vieille
Microbiology & Molecular Genetics/
Biochemistry & Molecular Biology
NatSci Junior Faculty Mentoring Award
2016-17

Julia V. Busik
Physiology
NatSci Postdoctoral Mentoring Award
2016-17

John B. Ohlrogge
Plant Biology
NatSci Distinguished Academic Staff Award 2016-17

Chrysoula Vasileiou
Chemistry
Undergraduate Academic Advisor Award
2016-17

Steven P. Poulilos
Chemistry
Graduate Academic Advisor Award
2016-17

Julie C. Libarkin
Integrative Studies in General Science/CREATE for STEM/Earth & Environmental Sciences
NatSci Support Staff Award
2016-17

Kimberly Crain
Physiology
NatSci Support Staff Award 2016-17

Nancy Lavrik
Chemistry
NatSci Excellence-in-Teaching Citation
2016-17

Pei Geng
Statistics & Probability
NatSci Excellence-in-Teaching Citation 2016-17

Michael Obsniuk
Physics & Astronomy
Lorena V. Blinn Endowed Teaching Award 2016-17

Jeanette McGuire
Integrative Biology
James D. Hoeschele Endowed Teaching Award 2016-17

Osvaldo Hernandez
Integrative Studies in General Science
Ronald W. Wilson Endowed Teaching Award 2016-17

Taylor Johnston
Plant, Soil & Microbial Sciences
Harlo Mervyn Mork Memorial Excellence in Teaching Award 2016-17

Austin Parish
Earth & Environmental Sciences
NatSci Faculty Teaching Prize 2016-17

- Marcos D. Caballero, Physics & Astronomy
- Teena Gerhardt, Mathematics
- Kristin Parent, Biochemistry & Molecular Biology
- Lynnmarie Posey, Chemistry