College of Natural Science Annual Faculty Meeting

November 10, 2017

College of Natural Science

College Faculty Meeting and Awards Ceremony

AGENDA

Friday, November 10, 2017
3:00 pm – 4:00 pm
1200 Molecular Plant Science Building

Items:

1) Approval of Agenda for November 10, 2017
2) Approval of Minutes from November 11, 2016
3) State of the College—Jim Kirkpatrick
4) Other Business
5) Awards Ceremony

Attachment:
Report of NatSci Standing Committees

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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 – Goal reached on Sept. 8, 2017; university wide, the campaign has raised $1.52 billion to date.

College of Natural Science
Empower Extraordinary Progress

- NatSci goal: $74 million
- $ 63.50 million raised to date (85.76% of goal)
- Raised $ 8.023M in 2016-2017.
- We added 4 new endowed faculty positions and 18 new endowments in FY 2016-17.
- Now have a total of 37 NatSci endowed or named chairs/professors.
- Four main campaign priorities/targets:
  - ✓ Engine of Opportunity – student support (71.17% of goal)
  - ✓ Creativity, Discovery, Learning – endowed positions (58.63% of goal)
  - ✓ Global Problem Solver – research (247.28% of goal)
  - ✓ Building a Vibrant Community – facilities (159.72% of goal)

MSU/NatSci Enrollment

Fall 2017

MSU overall – 50,019 students (38,286 undergrads)

NatSci Fall 2017 undergraduate majors 5,425

(plus 955 LBC coordinate majors)

NatSci Fall 2017 incoming freshmen 1,127

(plus 629 LBC freshmen)

NatSci Fall 2017 graduate students 985

(845 Ph.D. students, 140 M.S. students)

NatSci 2016-17 Budget

Total Recurring Budget: $69.6M – up 2.7%

$ 1.50M	Salary increases
$-1.36M	1% efficiency reduction+1% budget reduction
$ 1.2M	University allocation (new funding)

Total Non-Recurring Budget: $8.3M – up 8.6%

$ 564k	Program allocations (down $76k)
$ 4.7 M	Off-campus & online instruction (up $0.4M)
$ 3.1M	F&A (up $0.34M)

NatSci 2016-17 Budget

Recurring University Allocation – $1.2M

$ 1.1M	GII hires - salary
$ 105k	Math instruction initiative

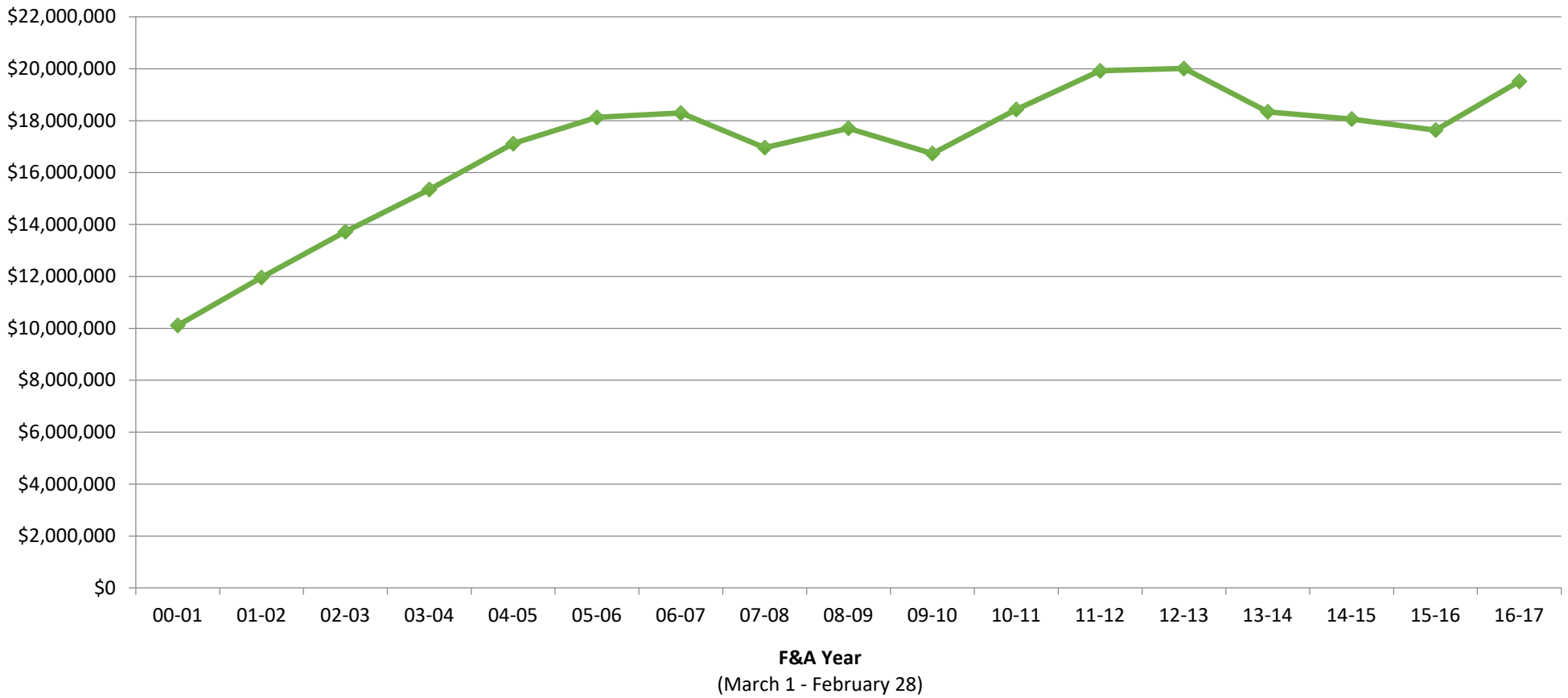
Additional University Support – $11.268M

$ 7.78M	Faculty start-up and retention
$ 1.22M	Research
$ 420k	Other instructional
$ 1.60M	Named/endowed professors
$ 610k	TLE and A+I

F&A Generated

00/01 through 16/17

(By NatSci Departments under all MAUs)



Department Leadership Changes

- **Erich Grotewold,** Biochemistry and Molecular Biology chair

Dean's Office Leadership Changes

- **Heidi Purdy**, director of undergraduate studies, Academic Student Affairs
- **Cheryl Sisk,** associate dean for faculty development, Dean's Office

New NatSci Faculty Members

Biochemistry and Molecular Biology

- **Erich Grotewold**, professor and department chair (plant biochemistry)

Chemistry

- **Karen Draths**, assistant professor (chemical biology)

Computational Mathematics, Science and Engineering (CMSE)

- **Min Chen**, assistant professor, CMSE/EES (computational methods for foundations of geoscience)
- **Arjun Krishnan**, assistant professor, CMSE/BMB (data science)
- **John Luginsland**, professor, CMSE/ECE (accelerator technology and plasma science)
- **Elizabeth Munch**, assistant professor, CMSE/MTH (data science)

New NatSci Faculty Members

CMSE (cont.)

- **Jianrong Wang**, assistant professor (data science)
- **Rongrong Wang,** assistant professor, CMSE/MTH (data science)
- **Yang Yang,** assistant professor (inverse problems)
- **Hui-Chia Yu,** assistant professor, CMSE/CHEMS (data science)

Integrative Biology

- **Gideon Bradburd**, assistant professor (evolutionary biology)
- **Mariah Meek**, assistant professor (evolutionary ecology)

New NatSci Faculty Members

Kellogg Biological Station

- **Sarah Fitzpatrick,** assistant professor, KBS/IBIO (conservation ecology and evolution)
- **Nick Haddad,** professor, KBS/IBIO (terrestrial ecology)

Mathematics

- **Ilya Kachkovskiy,** assistant professor (mathematics)
- **Linhui Shen**, assistant professor (mathematics)
- **Thomas Walpuski**, assistant professor (mathematics)

New NatSci Faculty Members

Physics and Astronomy

- **Mohammad Faghfoor Maghrebi**, assistant professor (condensed matter physics)

Physiology

- **Andrea Doseff,** professor (cell biology and nutraceuticals)

Plant Biology

- **Jiming Jiang**, professor, PLB/HORT (plant genomics)

New NatSci Faculty Members

Program in Mathematics Education

- **Shiv Karunakaran,** assistant professor, MTH/PRIME (math education)

Statistics & Probability

- **Gee Lee**, assistant professor, STT/MTH (actuarial science)

MSU Global Impact Initiative (GII)

The GII continues to have a significant impact on the development of MSU and the college.

Total MSU GII hires to date: 62 (20 senior; 42 junior)

Pending MSU hires: 14

Total Nat Sci hires to date: 24 (3 senior; 21 junior) – 38.7% of total MSU hires

Pending NatSci hires: 1 (senior)

Approved searches for 2017-18: 29 (2 senior, 27 junior) – **7** are NatSci hires (mass spec, big data astronomy, ultrafast, Cryo-EM, PRI)

Early CAREER Award Winners

Heiko Hergert – Physics & Astronomy, 2017 (DOE)

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

National and Int'l Award Winners

National Academy of Sciences:

Douglas Schemske, Plant Biology, KBS

National Academy of Inventors Fellow:

James Dye, Chemistry

Howard Hughes Medical Institute (HHMI) Investigator reappointment:

Sheng Yang He, Plant Biology, MMG, PRL

Fulbright Scholar:

Janette Boughman, Integrative Biology

Society Fellows

American Academy of Microbiology Fellow:

Robert Hausinger, Microbiology & Molecular Genetics, Biochemistry & Molecular Biology

American Association for the Advancement of Science (AAAS) Fellow:

Thomas Pinnavaia, professor emeritus, Chemistry

American Ornithological Society Fellow:

Catherine Lindell, Integrative Biology

American Physical Society Fellows:

Chris Adami and Remco Zegers, Physics & Astronomy

Society Fellows

American Society of Plant Biologists Fellow:

Gregg Howe, BMB, PRL

Royal Society of Chemistry Fellow:

Melanie M. Cooper, Chemistry

Society for Freshwater Science Fellow:

Stephen Hamilton, Integrative Biology, KBS

Young Investigator Awards

American Neurogastroenterology & Motility Society Young Investigator:

Julia Ganz, Integrative Biology

American Society of Naturalists Jasper Loftus Young Investigator:

Sarah Fitzpatrick, Integrative Biology

Research Corporation for Science Advancement Cottrell Scholar:

Laura Chomiuk, Physics & Astronomy

Ecological Society of America Early Career Fellow:

Elise Zipkin, Integrative Biology

National and Int'l Leadership Positions

American Astronomical Society President:

Megan Donahue, Physics and Astronomy

American Society of Plant Biologists President-Elect:

Robert Last, Plant Biology, Biochemistry and Molecular Biology

American Physical Society Editor-in-Chief:

Michael Thoennessen, Physics and Astronomy

MSU Foundation Professors

MSU Foundation Professors:

Bruno Basso, Earth and Environmental Sciences

Brian Gulbransen, Physiology, Neuroscience

Jiming Jiang, Plant Biology

Tapabrata Maiti, Statistics and Probability

James McCusker, Chemistry

Endowed Faculty and University Distinguished Professors

Jerry Cowen Endowed Chair of Experimental Physics:

Johannes Pollanen, Physics & Astronomy

Wu-Ki Tung Endowed Professor in Particle Physics

Chien-Ping (C.-P.) Yuan, Physics & Astronomy

James K. Billman, Jr. M.D. Endowed Professor

Amy Ralston, Biochemistry and Molecular Biology

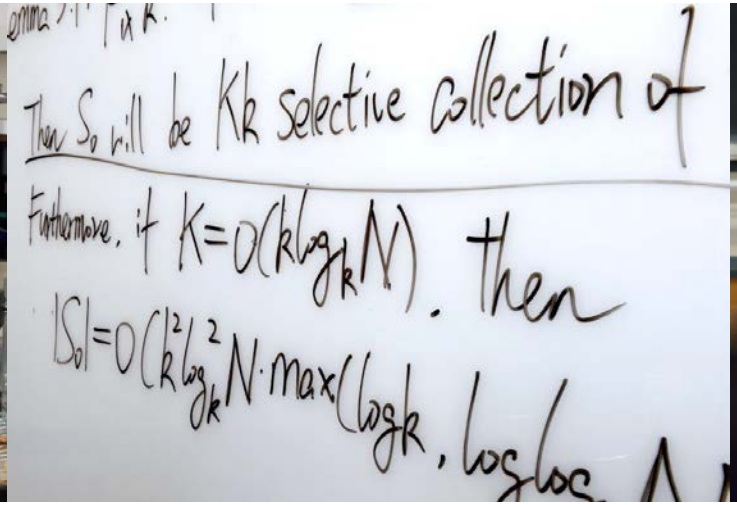
University Distinguished Professors:

Diane Ebert-May, Plant Biology

Gregg Howe, Biochemistry and Molecular Biology, PRL

Mark Meerschaert, Statistics and Probability

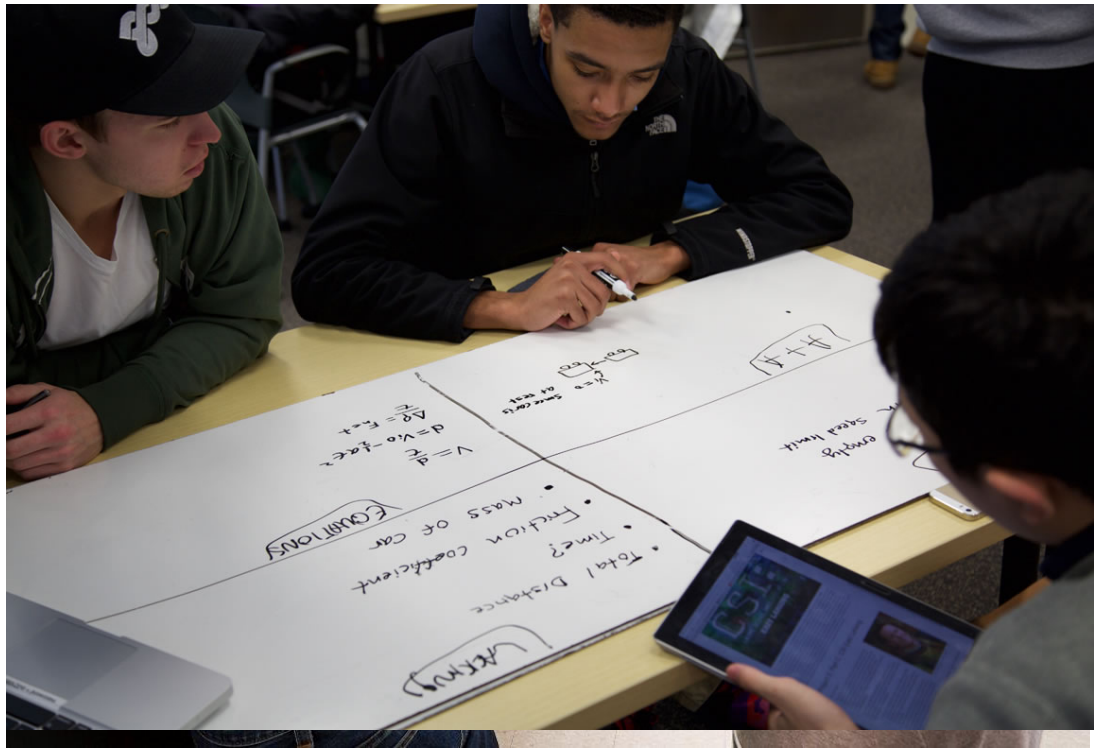
Key Education Initiatives



Transforming Undergraduate STEM Education

Long-term goal:

To transform the STEM gateway curriculum so that students learn to engage with the disciplinary core ideas, science practices and cross-cutting concepts in the same way scientists do.



Transforming Undergraduate STEM Education

- Biology Initiative
- Chemistry (CLUE/beSocratic)
- Mathematical and Statistical Sciences
- Physics
- Neuroscience
- Integrative Studies

Transforming Undergraduate STEM Education

Related efforts to improve STEM Ed:

- STEM Gateway Teaching Fellows Program
- HHMI-funded LEVERS Program
- Dow STEM Scholars Program
- Natural Science Transfer Scholars (NSF S-STEM)

Transforming Undergraduate STEM Education

- **Chemistry (5,000 students/year)**:
  - ✓The general chemistry curriculum is completely transformed.
  - ✓Implementation of the CLUE curriculum has resulted in improved learning, higher average grades for all students and decreasing DFW (D grade, F grade or withdrawal) rates.
  - ✓Efforts are underway to transform organic chemistry.
    (Melanie Cooper, Lynmarie Posey, Amy Pollock, others)

- **Biology (3,400 students/year)**:
  - ✓Significant progress has been made in the introductory biology courses through the AAU project and the overlapping NatSci Biology Initiative, which included a major focus on BioSci courses.
  - ✓The DFW rates for BioSci courses have also decreased. (Jon Stoltzfus, new BioSci director)

Transforming Undergraduate STEM Education (cont.)

- **Physics (4,500 students/year)**:
  - ✓ Projects and Practices in Physics (P^3) is a transformed calculus-based curriculum that incorporates 3-D learning, and has resulted in significant learning gains for students compared to traditional physics courses.(Danny Caballero)
  - ✓ Physics for Cellular and Molecular Biologists is a new curriculum developed by Lisa Lapidus in collaboration with Vashti Sawtelle.

- **Mathematical Science and Statistics**
  - ✓ Quantitative Literacy courses (MTH 101/102) have been very successful, with drop rates less than half that of other math gateway courses.
  - ✓ A pre-calculus pilot is being tested in MATH 103 sessions. Early results indicate that many of these students will move on to calculus.
  - ✓ Calculus for life scientists (MTH 124) shifted to a problem-based approach.
  - ✓ A reform effort is underway for Statistics for Scientists (STT 231) and a pilot will be implemented this spring.
  - ✓ Enhancement of the calculus sequence.

Transforming Undergraduate STEM Education (cont.)

- **Next Steps**

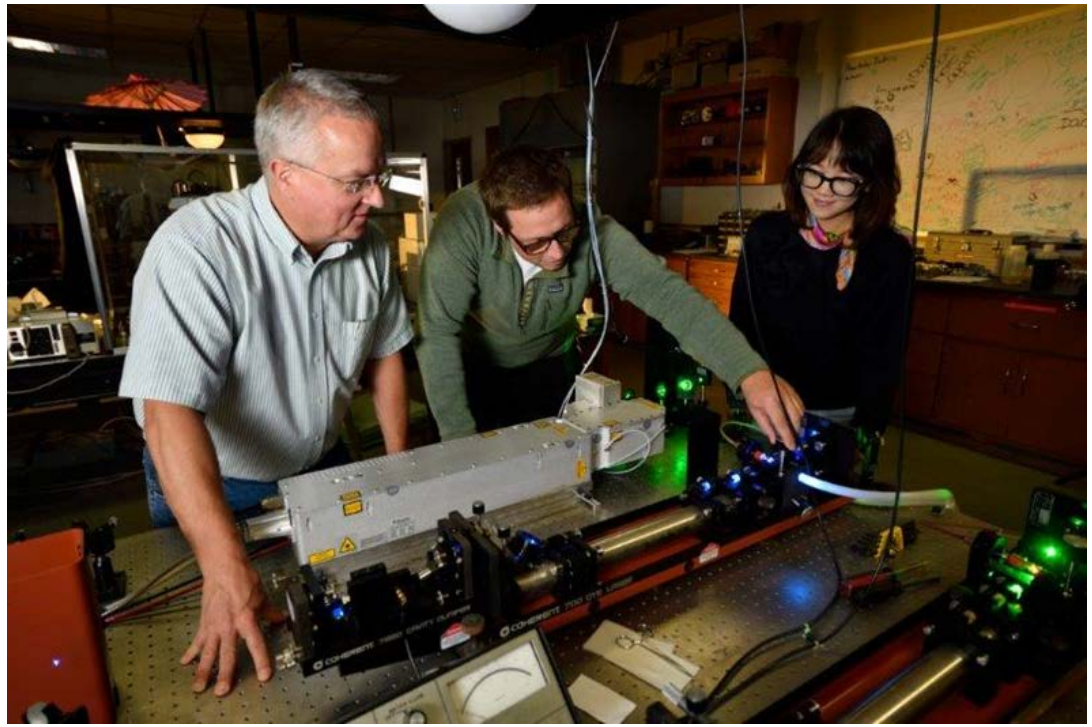
✓AAU project led to a new National Science Foundation IUSE grant: *Extending a Coherent Gateway to STEM Teaching and Learning.*

✓Expansion for STEM Gateway Fellowship to include faculty who teach 200- and 300-level courses. Call for a new cohort of fellows will be announced in February 2018.

✓Transformation of gateway physics courses to studio-style approach that blends lecture and lab.

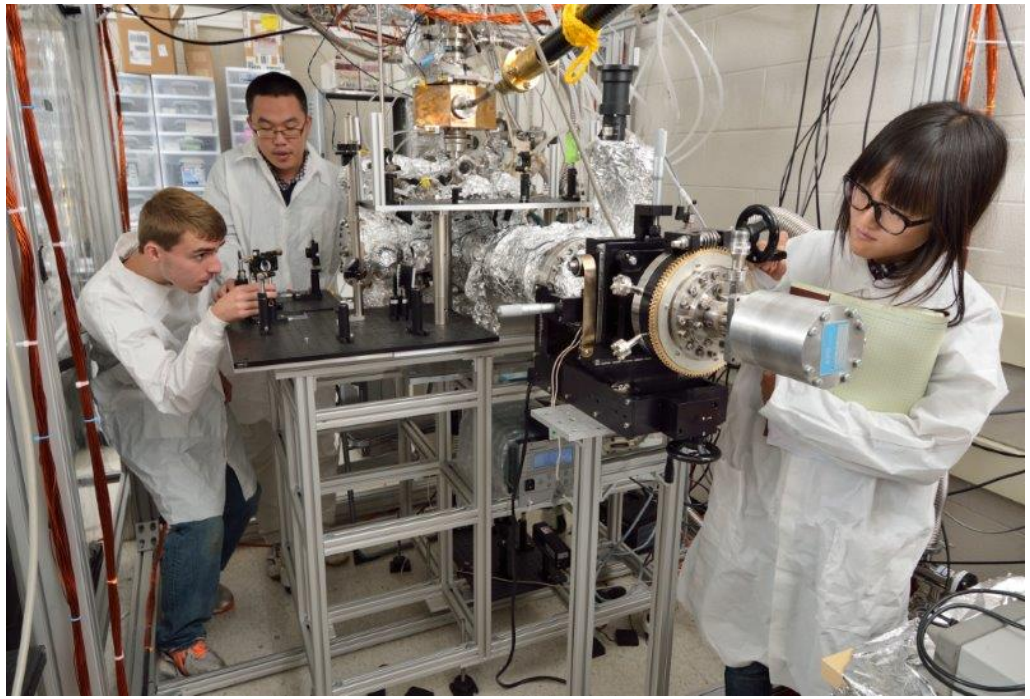
Graduate Education

- ✓The graduate student population in NatSci is robust – it has grown to 845 Ph.D. and 140 M.S. students as of Fall 2017.
- ✓New dual major program in Molecular Plant Sciences. Aligned with the research areas of a number of GII hires in the college.



Graduate Education

- ✓CMSE's graduate programs are up and running. For Fall 2017, Ph.D. enrollment is 37 students (8 are dual majors).
- ✓Graduate programs are recruiting high quality students, while advancing toward a more diverse population.



Institute for Quantitative Health Science and Engineering (IQ)

IQ mission: to create and advance tools for quantitative analyses and interrogation of complex biological systems to enable improved control of health and disease.

- ✓A research collaboration among the MSU Colleges of Engineering, Human Medicine and NatSci devoted to basic and applied research at the interface of life sciences, engineering, information sciences and other physical and mathematical sciences.
- ✓Located at the BioEngineering facility, IQ forms a hub for biomedicine at MSU.
- ✓Five NatSci faculty are initial core members of IQ.

STEM Laboratory Education Building

- NatSci and Lyman Briggs held joint focus groups with departments in 2016 and with Sasaki Consulting and departmental leaders in STEM education in 2017 to begin programming and designing the facility.
- NatSci, Engineering, OPB, and IPF are now working with Integrated Design Solutions (IDS) and Ellenzweig, the architectural/engineering team selected for the project, to finalize the design.
- The new building will have about 80,000 sq. ft. of assignable space, (130,000 GSF) that will allow new teaching pedagogies and improve STEM laboratory instruction. Construction is expected to be completed to allow instruction to begin in Fall 2020.

Interdisciplinary Science & Technology Building

- This building is part of MSU's Strategic Academic Development Initiative to provide modern teaching and interdisciplinary research space necessary to support significant growth in STEM-related fields and to support the university's investment in the Global Impact Initiative to recruit more than 100 new faculty investigators.
- The six-story, 160,000 square-foot building (300,000 GSF) will be located in the South Academic District adjacent to the Bott Nursing Building, the BioEngineering Facility and the MSU Clinical Center.
- Construction has begun and is expected to be complete in Fall 2019.

Some Significant New Grants

- *NSF STEM education-related grants:* Total of ~$9.5M for 8 projects.
- *DOE Bioenergy:* $ 10M for new biofuels (boost Camelina yield; Danny Schnell, Erich Grotewold).

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College of Natural Science Awards

2017-18

NatSci Outstanding Faculty Award 2017-18

Gary J. Blanchard

Chemistry

NatSci Outstanding Faculty Award 2017-18

Babak Borhan

Chemistry

NatSci Outstanding Faculty Award 2017-18

Alexandra Gade

Physics and Astronomy

NatSci Outstanding Faculty Award 2017-18

Jianliang Qian

Mathematics

NatSci Teacher-Scholar Award 2017-18

Kristin N. Parent

Biochemistry and Molecular Biology

NatSci Teacher-Scholar Award 2017-18

Alfred J. Robison

Physiology

NatSci Undergraduate Teaching Award 2017-18

Benjamin I. Schmidt

Mathematics

NatSci Undergraduate Teaching Award 2017-18

Melanie M. Cooper

Chemistry

NatSci Junior Faculty Mentoring Award 2017-18

Michael Thoennessen

Physics and Astronomy

NatSci Postdoctoral Mentoring Award 2017-18

Robert L. Last

Biochemistry and Molecular Biology

NatSci Distinguished Academic Staff Award 2017-18

Alan M. Fryday

Plant Biology

Undergraduate Academic Advisor Award 2017-18

Kanchan A. Pavangadkar

Neuroscience

Graduate Academic Advisor Award 2017-18

Shannon Manning

Microbiology & Molecular Genetics

NatSci Support Staff Award 2017-18

Judy Brown

College of Natural Science

NatSci Support Staff Award 2017-18

Christine Van Deuren

Microbiology and Molecular Genetics

NatSci Excellence-in-Teaching Citation 2017-18

Sarah Klanderman

Mathematics

NatSci Excellence-in-Teaching Citation 2017-18

Matthew Kolp

Plant Biology

NatSci Undergraduate Learning Assistant Award 2017-18

Madelyn Klinkoski

Biochemistry and Molecular Biology

NatSci Undergraduate Learning Assistant Award 2017-18

Jason Sammut

Center for Integrative Studies in General Science

Lorena V. Blinn Endowed Teaching Award 2017-18

Robert E. Drost

Earth and Environmental Sciences

James D. Hoeschele Endowed Teaching Award 2017-18

Julie C. Libarkin

CISGS, Integrative Biology

Ronald W. Wilson Endowed Teaching Award 2017-18

Sara D. Miller

MSU Libraries, Interdisciplinary Teaching and Learning Initiatives

Harlo Mervyn Mork Memorial Excellence in Teaching Award 2017-18

Kristin R. Poley

Entomology

Harlo Mervyn Mork Memorial Excellence in Teaching Award 2017-18

Mahdieh Tanha

Mechanical Engineering

NatSci Faculty Teaching Prize 2017-18

- **Tyce R. DeYoung**, Physics & Astronomy
- **Charles H. Elzinga**, Biological Science Program
- **Lisa Lapidus**, Physics and Astronomy
- **Jeanette M. McGuire,** Integrative Biology
- **Benjamin I. Schmidt,** Mathematics
- **Ashoke K. Sinha,** Statistics and Probability
- **Chrysoula Vasileiou,** Chemistry

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