CWS Mission & Programs

• Center began in 2005
• Currently has over 85 members
• Mission:
  – To advance scientific research & knowledge for understanding, protecting, and restoring water resources and their sustainable use by humans & ecosystems around the Great Lakes and the world
CWS Funding

- 85% of the funding goes to internal grant programs
- 15% goes to administering core programs
- VPRGS has invested $1,950,000 in CWS
- CWS has generated $20.3 million in external funding
- CWS has provided a 10:1 return on MSU investment
CWS Strategic Plan

CWS Sustainability Initiative

Center Support Fund
- Administration
- Web site
- Faculty member services

Fund for Excellence in Water Science Research
- Endowment
- External Grants
- International Water Initiative

Outreach Fund
- Water Fellows program
- Community Outreach

Water Science Park Initiative Fund
Center Support: Administration

- Faculty member services
  - Facilitate grant proposals
  - Facilitate research groups
  - Organize seminars
  - Email and print newsletters
  - Web site
- Lead large collaborative grant efforts
- Administration projects
- Outreach projects
- Partner with other programs on campus
  - ESPP & SMEP: resources for new faculty
  - LPI: Citizen Planner programs on water
Sustainability Science at Michigan State University
A New Faculty Field Guide to Funding, Collaborators, and Keeping Balanced

Welcome to MSU! This guide orients faculty interested in sustainability science to university opportunities. The guide details resources and provides counsel from MSU community members. Sections address:

- Accessing Funding
- Finding Collaborators
- Keeping Balanced (useful for all faculty members)

In addition, a matrix detailed the offerings of sustainability-related centers and programs on campus.

This guide was compiled by Erin Dreegel (Center for Water Sciences), Maya Fischeroff (Environmental Science and Policy Program), and Mary Schuch (Sustainable Michigan Endowed Project). Please contact us with questions or suggestions for future versions of this guide.

Finding Funding
Acquiring funding is an inescapable part of faculty life, and MSU tries to make it easier for you in various ways... Learn more »

Finding Collaborators
You'd like to find others who share your interests, or someone with expertise you lack. The university has various mechanisms for making those connections. Learn more »

Keeping Balanced
If you need to relieve some stress or just need some time out of the office, check out these resources. Learn more »

Search Unit Matrix
MSU's many interdepartmental units are key providers of resources. As a result, this guide includes comprehensive information about them and the resources they provide. Learn more »

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http://espp.msu.edu/sustain/
Outreach

• **Water Fellows series**
  – Goal: create dialogue on important water issues
  – Products: presentation to MI legislature, 3 reports, 6 fact sheets
  – Current series focuses on stormwater
  – Model for other outreach programs

• **Interaction with community**
  – Presentations to stakeholder groups
  – Work with communities on water quality issues
  – Muskegon River Watershed Initiative
Stormwater Workshops

- **February 6, 2009** Climate change, stormwater, and Michigan
  - Alan Steinman, Grand Valley State University
  - David Easterling, National Climatic Data Center

- **March 6, 2009** Stormwater assessment tools: monitoring
  - Roger Bannerman, Wisconsin Department of Natural Resources

- **March 27, 2009** Stormwater assessment tools: modeling
  - Alan Vicory, Ohio River Valley Water Sanitation Commission

- **April 10, 2009** Ecosystem impacts & approaches
  - Laurie Fowler, University of Georgia
  - Dave Drullinger, Michigan Department of Environmental Quality

- **April 24, 2009** Green stormwater BMP designs & low impact development
  - William Hunt, North Carolina State University
  - Amy Mangus, Southeast Michigan Council of Governments

- **May 15, 2009** Getting creative with stormwater
  - Patrick Judd, Conservation Design Forum
  - Stuart Echols, Pennsylvania State University

[Webcast on wmsu.org]
Community Programs

- Investigation of water and sediment quality associated with the Muskegon County Wastewater Management System
- Investigation of water quality and "muck" at Saginaw Bay Parks and Beaches
- Microbiological quality of St. Mary's River water
- Study of Silver Lake water quality
- Others: Buck Creek, Coldwater Creek, Traverse City, Sault Ste. Marie, West Lake
Muskegon Watershed Research Partnership (MWRP)

Goal:
*Improve & Protect Great Lakes Fisheries Through Sound Science*

http://www.mwrp.net
Water Utilities Programs

• Only certified laboratory for Cryptosporidium and Giardia analysis
• Assisting 10 utilities in Michigan, 1 outside state
• Regional projects
  – City of Toledo
  – Chicago Water Reclamation Facility
State Programs

- MDEQ re-evaluating *E. coli* monitoring for surface waters based on CWS report
- Working with DEQ partners on publications
  - Applying the Annapolis Protocol to Michigan beaches
  - Land use and *E. coli* relationships
National Programs

• **Algae Lab Supporting National Assessments**
  – EPA: National River & Stream Assessment
  – EPA: National Lake Survey
  – Guidance EPA: National Wetland Condition Assessment
  – USGS: National Synthesis on Nutrient Stressors in Ag-Dominated Ecosystems

• **Proposal: $1.5 million for co-op “Linking Assessment of Ecosystem Services and Condition”**

• **National inventory of water centers**
Algal Biofuels

- **Michigan Workgroup Partnership**
  - MSU, WMU, WSU
  - Interdisciplinary: molecular, ecological, and engineering, marketing & sun to product strategy

- **MEDC – Support of MI Entrepreneurs (e.g. Sequest)**

- **MPSC Grant – Liao (PI), Liu, Safferman, Stevenson**
  - Small farm biorefinery strategy
  - Wastes used for energy and algal co-products
  - Sustainability: waste treatment and nutrient reduction
  - Transferable to municipal waste treatment

- **DOE & NSF program possibilities**
Madzi for Malawi

- Develop an innovative menu approach for clean water practices and technologies, and test its use in a rural and peri-urban area of Southern Malawi
- Form a Consortium of Stakeholders and a Water and Sanitation Resource Center at WASHTED, Polytechnic, to make data easily accessible
- Provide training and capacity building through hands-on workshops
International Research

Measuring and Mapping Sewage Contributions to Global Waters

• Our goal for the proposed research project is to develop a set of standardized quantitative biomolecular tools and methods that can be used as common yardsticks to examine sewage and human waste inputs to waters around the world.
**International Research**

Table 1. International Collaboratory for Sewage (Current membership, March 2009)

<table>
<thead>
<tr>
<th>Region</th>
<th>Country</th>
<th>Researcher</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>Japan</td>
<td>Dr. Yoshi Masgo</td>
<td>Tohoku Univ.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr. Yoichi Kamagata &amp; Dr. Satoshi Okabe</td>
<td>Hokkaido Univ.</td>
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<tr>
<td></td>
<td>Korea</td>
<td>Dr. Joonhong Park</td>
<td>Yonsei Univ.</td>
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<tr>
<td></td>
<td>Singapore</td>
<td>Dr. Mark Wong</td>
<td>Public Utilities Board</td>
</tr>
<tr>
<td>Africa</td>
<td>Malawi</td>
<td>Dr. Geoffrey Chavula &amp; Dr. Tony Grimason</td>
<td>Poly Tech Univ.</td>
</tr>
<tr>
<td></td>
<td>South Africa</td>
<td>Dr. Eugene Cloete</td>
<td>Stellenbosch Univ.</td>
</tr>
<tr>
<td>Europe</td>
<td>Austria</td>
<td>Dr. Andreas H. Farreltner</td>
<td>Vienna University of Technology</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>Dr. Andreas Tidhm</td>
<td>Technologiezentrum Wasser (TZW) / Water Technology Center</td>
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<tr>
<td></td>
<td>Greece</td>
<td>Dr. Apostolos Vantarakis</td>
<td>Univ. of Patras</td>
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<td></td>
<td>Italy</td>
<td>Prof. Annalaura Carducci</td>
<td>Univ. of Pisa</td>
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<td></td>
<td></td>
<td>Dr. Gertjan Medema</td>
<td>KWR Watercycle Research Institute</td>
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<tr>
<td></td>
<td>Netherlands</td>
<td>Dr. Mette Myrmel</td>
<td>Norwegian School of Veterinary Science</td>
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<tr>
<td></td>
<td>Spain</td>
<td>Dr. Rosina Girones &amp; Dr. Albert Bosch</td>
<td>Univ. of Barcelona</td>
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<tr>
<td></td>
<td>United Kingdom</td>
<td>Dr. Huw Taylor</td>
<td>Univ. of Brighton</td>
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<tr>
<td>North America</td>
<td>Mexico</td>
<td>Dr. Blanca Elena Jiménez Cisneros</td>
<td>Instituto de Ingeniería UNAM</td>
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<tr>
<td></td>
<td>Canada</td>
<td>Dr. Tom Edge</td>
<td>National Water Research Inst. Environ. Canada</td>
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<td>US</td>
<td>Dr. Joan Rose &amp; Dr. Irene Xagotaraki</td>
<td>Michigan State Univ.</td>
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<td>Dr. Charles Haas</td>
<td>Drexel Univ.</td>
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<td>Dr. Alice Layton</td>
<td>Univ. of Tennessee</td>
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<td></td>
<td></td>
<td>Dr. Wen-Tso Liu</td>
<td>Univ. of Illinois at Urbana</td>
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<td>Dr. Sandra McLellan</td>
<td>Champagne</td>
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<td>Dr. Mark Sobsey</td>
<td>Univ. Wisconsin at Milwaukee</td>
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<td>Dr. Stefan Wurtz</td>
<td>Univ. North Carolina</td>
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<tr>
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<td>Brazil</td>
<td>Dr. Maria Sato</td>
<td>CETESB</td>
</tr>
<tr>
<td>South America</td>
<td>Venezuela</td>
<td>Dr. Walter Quintero Betancourt</td>
<td>Venezuelan Institute for Scientific Research (IVIC)</td>
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<tr>
<td>Oceania</td>
<td>Australia</td>
<td>Dr. Simon Toze</td>
<td>CSIRO Land and Water</td>
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<tr>
<td></td>
<td>New Zealand</td>
<td>Dr. Warsh Ahmed &amp; Dr. Ashantha Goonetilleke</td>
<td>Queensland Univ. of Technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr. Marion Savill</td>
<td>Institute of Environmental Science and Research Ltd</td>
</tr>
</tbody>
</table>
International Research: China

- Coupled human and natural systems
- Focus on nutrients, algae, and global change
- Collaboration with Zhejiang University and multiple MSU research centers, departments and colleges
Foundations & Corporate Sponsors

- The Coca-Cola Foundation
  - Safe Tap project in Malawi
- Mars Corporation
  - Interest in CAMRA, virtual water, pet food safety, pet-human interfaces
- Google & Microsoft
  - Global map of water quality and sewage inputs
- MEDC
  - Algal biofuels
Large, Collaborative Grants

• MSU IGERT (Coupled Human and Aquatic Systems (CHAAS))
  – Advance understanding of relationships among human and natural systems, thresholds, and global change to address critical international water issues through graduate research and education
  – Great Lakes, Africa, China
  – Partners: CWS, CSIS, GenCen, ESPP, CGCEO

• Develop grants for NSF coupled human and natural systems
  – Research component of IGERT
\textbf{Center Grants: CAMRA-H2O}

- Mission: create a national center for furthering the understanding of how microbial life cycles influence risk for coupled human and natural water systems.
- Build on existing national research center (CAMRA, the Center for Advancing Microbial Risk Assessment)
- Focus on creating national expertise in three thrust areas
  - Analyzing the Freshwater Microbiome using Functional and Phylo-Genomics
  - Exploring Microbial Life Cycles and Risks in Water Pathways
  - Quantifying Microbial Risks and Improving Decision Support
- Proposal submitted to NSF S&T program
- Will now submit to Engineering Research Center program
- Build upon CWS work: water, risk and microbiology expertise at MSU
Water Science Research

• External research grants
  – $20.3 million total
  – $3.5 million generated by post-doc grantees

• Over 30 publications generated directly as a result of CWS funding
  – High impact journals
    • Nature (Impact Factor: 28.751)
    • Applied and Environmental Microbiology (3.532)
    • Geology (3.477)
    • Limnology and Oceanography (3.277)

• Over 40 presentations
Water Science Research

• Venture Grants
• Post-Doc Grants
  – Expose Nodes of Research Excellence
    • Sustainable Aquatic Ecosystems
      – Global change and sustainability
      – Harmful algal blooms
    • Water Science and Health
    • Aquatic Biogeochemistry & Molecular Biodiversity
• Coupled human & aquatic systems
• International water research
Research Nodes: Highlights

• **Aquatic ecosystems**
  – 3 NSF proposals funded
  – Publication in Nature

• **Water & health**
  – AWWARF proposal funded, over $800,000 generated
  – Publications in Water Research, Environmental Science & Technology

• **Coupled human & aquatic systems**
  – IGERT proposal and continuing efforts

• **International water research**
  – China, Malawi, Great Lakes
  – NSF and Coca-Cola Foundation proposals submitted
  – More to come
Highlight Programs

• CWS funding creates critical mass for stimulating research

• Elena Litchman (PI)
  – Research on Harmful Algal Blooms
    • Venture grant: required equipment
    • Post-doc grant: foundation for research
  – Outcomes
    • NSF Career award
CWS Challenge

- Few external programs fund administrative activities

- Need core administrative activities to “make things happen”
Funding Proposal

• **MSU support for core programs**
  – Administration: salary, website, faculty services
  – Outreach: seminars, Fellows program, publications

• **Funding from multiple MSU entities**
  – VPRGS, Provost, colleges, departments, etc.
The Future...

• Funding
  – Large, collaborative grants
  – Center grants
  – Foundation & corporate grants
  – Business opportunities
  – Education

• International Projects

• Water Science Park

• Great Lakes Watershed Initiative
# Funding Core Programs

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<tr>
<td><strong>Personnel</strong></td>
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<tr>
<td>Associate Director Salary</td>
<td>$58,100</td>
<td>$59,844</td>
<td>$61,639</td>
<td>$63,488</td>
<td>$65,393</td>
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<td>Associate Director Fringe</td>
<td>$24,446</td>
<td>$25,633</td>
<td>$26,748</td>
<td>$27,842</td>
<td>$28,982</td>
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<tr>
<td>Research Assistant Salary</td>
<td>$42,766</td>
<td>$44,049</td>
<td>$45,371</td>
<td>$46,732</td>
<td>$48,134</td>
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<td>Research Assistant Fringe</td>
<td>$17,140</td>
<td>$18,109</td>
<td>$18,997</td>
<td>$19,859</td>
<td>$20,760</td>
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<td><strong>Materials and Supplies</strong></td>
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<td>Web site</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
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<td>Administrative supplies</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
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<tr>
<td><strong>Outreach</strong></td>
<td></td>
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<tr>
<td>Workshops</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$20,000</td>
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<td>Seminars</td>
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<td>Publications</td>
<td>$5,000</td>
<td>$5,000</td>
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<tr>
<td><strong>Total</strong></td>
<td>$178,452</td>
<td>$183,635</td>
<td>$188,755</td>
<td>$193,921</td>
<td>$199,269</td>
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Minimal investment maintains Center.
Funding Core Programs

• Why more than 15% of current funding?

• Current funding for core programs supplemented by other funding sources
  – CAMRA: ending in 2010
  – Nowlin, campus partners

• Additional funds for full-time assistant and outreach programs
Water Science Park

• To build upon the major interfaces and strengths currently at MSU
• To build a nationally and internationally renowned MSU Water Science Park
• To facilitate:
  – outstanding integrated research programs
  – environmental science education
  – future assessment and decision making support from the local to the global scales
  – Create a shared space with the State, USGS, NOAA and MSU
Design Concepts

- Open design to encourage interaction
- Green building
- Showcase MSU expertise in water
Space for Large-scale Experiments

- Ecological research
- Biofuels & algae
- Pathogen & pollutant transport
State of the Art Labs

- High tech
- Open design
- Wet labs
Interaction with the Public

Visitors can see scientists at work

Scientists can interact with visitors

Space for workshops and hosting educational groups
Outreach & Education
Meeting Space

Host research meetings, workshops, and conferences

Web casting and web conferencing capabilities
Green Design

- LEED certification
- Innovative & artful water management
Water Science Park

- A place for researchers to do cutting-edge research
- A place for the public and decision-makers to interact with scientists and learn about water
- Seeking planning grant for visioning process
Other Opportunities

- Climate adaptability
- Stimulus money for Great Lakes Restoration
- Re-establish MESB
- Online courses
- Johnson & Johnson
- Frey Foundation
Great Lakes Watersheds Initiative

• Science to support sustainability of the Great Lakes Ecosystem
• Major MSU/CWS lead research initiative
• Coupled Human and Natural Systems Framework
• Multidisciplinary and Multi-Institutional
  – Natural & social sciences
  – MSU Centers, Michigan universities, Regional partners (academic, gov’t, NGO)
  – Partner with other MSU initiatives (Urban LTER, SMEP)
• Support
  – MSU Start-up
  – NSF, Foundations (GLFT & more), EPA, DOE
• With MSU funding for core administrative programs we will:

  – Maintain a focus on the Water Initiative on campus
    • Seek external research funds
    • Continue outreach programs
    • Facilitate collaborative research grants

  – Make MSU the “go-to” place for water research and outreach