

# Water Resources and Aquatic Processes

- Specific Research Projects
  - Membrane Treatment Processes
  - Energy Recovery from Wastewater
  - Decentralized Treatment and Infrastructure
- Collaborations in Education
- Potential Funding and Collaboration Avenues
- Next Steps

# Membrane Treatment Processes

- Membrane processes have major role to play in the future.
- Questions:
  - Energy requirements (depend on membrane type and source water)
  - Process considerations: scaling, **(bio)fouling**, technology selection, biomimetic systems, materials
  - Water quality for reuse applications (reclaimed wastewater)
  - Residuals management
  - Membrane bioreactors for wastewater treatment
- Partners:
  - Current Programs: Technion, IIT-Bombay, Hong Kong University, National University of Singapore, University of Tokyo
  - Interest: Broad, Develop Collective Ability

# Energy Recovery from Wastewater

- Wastewater as a Resource
  - Rethinking the overall approach to wastewater treatment
  - Systems approach to integrate new developments
- Anaerobic Digestion
- Microbial Fuel Cells
- Bio-Hydrogen Production
- Partners: All Participants
- Collaborations
  - Technologies
  - Techniques (molecular microbiology)
  - Emerging Contaminants (endocrine disrupting compounds)

# Water and Wastewater Treatment: Infrastructure and Decentralization

- Decentralized vs. Centralized
  - Demands of increasing urban populations
  - Trend in major Asian cities
- Systems-level Optimization
  - Scaling issues of cost and efficiency
  - Meta-model (e.g., John Crittenden's Talk)
- Sustainability (triple bottom line)

# Educational Collaboration

- Build Upon Existing List of Courses (176):
  - Organize Thematically
  - What do we all teach? What does only one of us teach?
- Start with Graduate Courses
- Distance Learning (webcasting from remote institution with on-site academic support)
- On-line Discussions
- Areas of Need/Interest:
  - Sustainable technology
  - Ecology and Ecological Engineering
  - Decentralized treatment, water reuse

# Potential Avenues of Funding and Collaboration

- Collaboration:
  - Current students who we can co-advise
    - with or without student travel
  - Conferences as focal points for collaboration
- Funding:
  - Existing programs in our home countries.
  - University programs to facilitate interactions
  - Target resources for student support

# Next Steps

- Communication Infrastructure
  - Website: courses, research interests, upcoming conferences (Hawaii)
  - Email distribution list
- Interest in meeting again
- Research: student co-advising and exchanges
- Education: course list, initiate co-teaching and exchange of modules



**Thank you to all participants.**

**Questions**