Leadership & Collaboration

Rance Cleaveland
CMACS Deputy Director
University of Maryland

2nd Year Review Meeting, Carnegie Mellon University
November 3, 2011
CMACS: An Overview

- Started in September 2009
- 8 institutions, 19 PIs, plus students & postdocs

- Jet Propulsion Lab joins CMACS in May 2011
  - Delay due to legal problems: ITAR regulations, ARRA (stimulus) funding restrictions

- Many research and education successes already, and infrastructure in place for many more!
CMACS: Research Team
CMACS Leadership Team

- Edmund M. Clarke (Carnegie Mellon – Lead PI)
- Rance Cleaveland (Maryland – Deputy Director)
- Scott Smolka (Stony Brook – Deputy Director)
- Paolo Zuliani (Carnegie Mellon – Technical Coordinator)
- Nancy Griffeth (Lehman – Education Director)
- Flavio Fenton (Cornell – Education Co-Director)
- Klaus Havelund (Jet Propulsion Lab)
- Denny Marous (CMU – Administrative Coordinator)
CMACS Advisory Board

- Ken Butts, PhD
  *Toyota: Executive Engineer at Toyota Motor Engineering & Manufacturing North America*

- David Dill, PhD
  *Stanford University: Professor of Computer Science*

- Michael T. Lotze, MD
  *University of Pittsburgh: Professor of Surgery and Bioengineering; Vice Chair of Research within the Department of Surgery; Asst. Vice Chancellor in the six schools of the Health Sciences at Pitt; and Director of Strategic Partnerships within the University of Pittsburgh Cancer Institute*

- Colin Hill
  *GNS Healthcare: CEO, President, Chairman, and Co-Founder*

- Steve Miller, PhD
  *Rockwell-Collins: Principal Engineering Manager*

- Janos Sztipanovits
  *Vanderbilt University: E. Bronson Ingram Distinguished Professor of Engineering; Professor of Electrical Engineering and Professor of Computer Engineering; Director of the Institute for Software Integrated Systems*
Management Approach

- CMACS is geographically, institutionally dispersed
- Team members are creative, ambitious, intellectual
- Management approach
  - Give team members opportunities to interact
  - Let their natural scientific impulses take over!
Interaction Opportunities

- CMACS PI review meetings:
  - Oct. 31 - Nov. 1, 2009. Kickoff meeting at CMU
  - Mar. 4-5, 2010. CMU
  - Oct. 28-29, 2010. NYU
  - April 28-29, 2011. UMD

- Bi-weekly teleconferences via Skype / webex
  - Management issues
  - Planning
  - Research presentations

- Research visits across institutions

- Our wiki http://wiki.cmacs.cs.cmu.edu

- Our website http://cmacs.cs.cmu.edu
CMACS: Whole >> Σ Parts

- Many breakthroughs due to new, cross-institutional, cross-disciplinary collaborations

- Typical example: Atrial Fibrillation Research

Stony Brook
- Bartocci (Computer Sci)
- Glimm (Applied Math)
- Grosu (Computer Sci)
- Smolka (Computer Sci)

Cornell/RIT
- Cherry (Biomedical)
- Fenton (Physics)
- Gilmour (Biomedical)

NYU
- Le Guernic (Computer Sci)
Low-energy control of electrical turbulence in the heart
Luther, Fenton, et al.

From Cardiac Cells to Genetic Regulatory Networks
CMACS: Whole >> Σ Parts

- Another example: Pancreatic Cancer Research

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<thead>
<tr>
<th>CMU</th>
<th>Pitt</th>
<th>UMD</th>
<th>UPMC</th>
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<tbody>
<tr>
<td>Clarke (Computer Sci)</td>
<td>Faeder (Sys. Biol.)</td>
<td>Wu (Public Health)</td>
<td>Lotze (Cancer Inst.)</td>
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<tr>
<td>Gong (Computer Sci)</td>
<td>Miskov-Z. (Sys. Biol.)</td>
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<td>TGen (June 11)</td>
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<td>Wang (Computer Sci)</td>
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<td>Wu (Public Health)</td>
<td>Posner (Biophysics)</td>
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<td>Zuliani (Computer Sci)</td>
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<td>Von Hoff (Oncology)</td>
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- TGen = **Translational Genomics Research Institute**
CMACS: Whole >> Σ Parts

- Pancreatic Cancer Research

- Analysis and Verification of the HMGB1 Signaling Pathway. Gong, Zuliani, Komuravelli, Faeder, Clarke. 
  *BMC Bioinformatics 2010. Best Paper Award at InCoB 2010.*

- Computational Modeling and Verification of Signaling Pathways in Cancer. Gong, Zuliani, Komuravelli, Faeder, Clarke. 
  *Algebraic and Numeric Biology 2010.*

- A Transcriptome Analysis by Lasso Penalized Cox Regression for Pancreatic Cancer Survival. 
  Wu, Gong, Clarke. *Journal of Bioinformatics and Computational Biology.*

- … see our website for more papers
CMACS: Whole >> Σ Parts

- Another example: Education Programs
  - Course modules
  - Student research workshops
    - Expose undergrads to CMACS, scientific research
    - Enable them to engage in science
    - Publications!
    - Excellent feedback
  - Curricular efforts
CMACS: Whole >> Σ Parts

- Another example: Outreach
  - Advisory board
  - Industrial workshops
Management Challenges Moving Forward

- Continue to promote interactions among researchers
- Enhance mechanisms for integration of research results across challenge problems
- Grooming of new leaders