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Mork Family Department of
Chemical Engineering and Materials Science

USC Viterbi
School of Engineering

Introduction to Reservoir Monitoring Consortium

Fred Aminzadeh

RMC Inaugural Meeting

September 14 , 2011

Goals of the Inaugural Meeting

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- Introduce RMC and its Objectives
- Provide necessary details about the Project Portfolio
- Receive feedback from the industry on
  - Projects of the highest impact
  - How we can complement the work inside oil companies
  - How we can complement the ongoing R&D work in the service companies
- Start the process for project ranking
- Start the process of forming the Strategic and Technical Advisory Board
- Determine what it will take to get commitment from companies for Base Funding

Why RMC?

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- Identify the current key technology gaps
- Focus on interfaces between different disciplines
- Integrate data, information, expertise and workflows
- Maintain a balance between the short term high impact research and long term needs
- Develop dynamic reservoir monitoring (DRM) workflow
- DRM for different reservoir types:
  - Conventional,
  - Shale,
  - Deep water,
  - Carbonate,
  - Mature,
  - HP/HT

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Selected Faculty / Expertise

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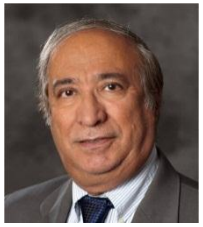
Iraj Ershaghi


Fred Aminzadeh


Farnoush B. Kashani


Donald Hill


Behnam Jafarpour


Charles Sammis


Kristian Jessen


Muhammed Sahimi

- Integrated Reservoir Simulation
- Signal Processing /Pattern Recognition
- Fuzzy Logic / Neural Networks / GA
- 4D Geophysics / Passive Seismic
- Reservoir Characterization
- Petrophysics
- Sensors (compressed sensing)
- Nano Technology . Systems / Control
- Physical Modeling


Cyrus Shahabi


Urbashi Mitra


Jala Abedi


Wang Shangxu


Andrei Popa


Kurt M. Strack

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Consortium at a Glance

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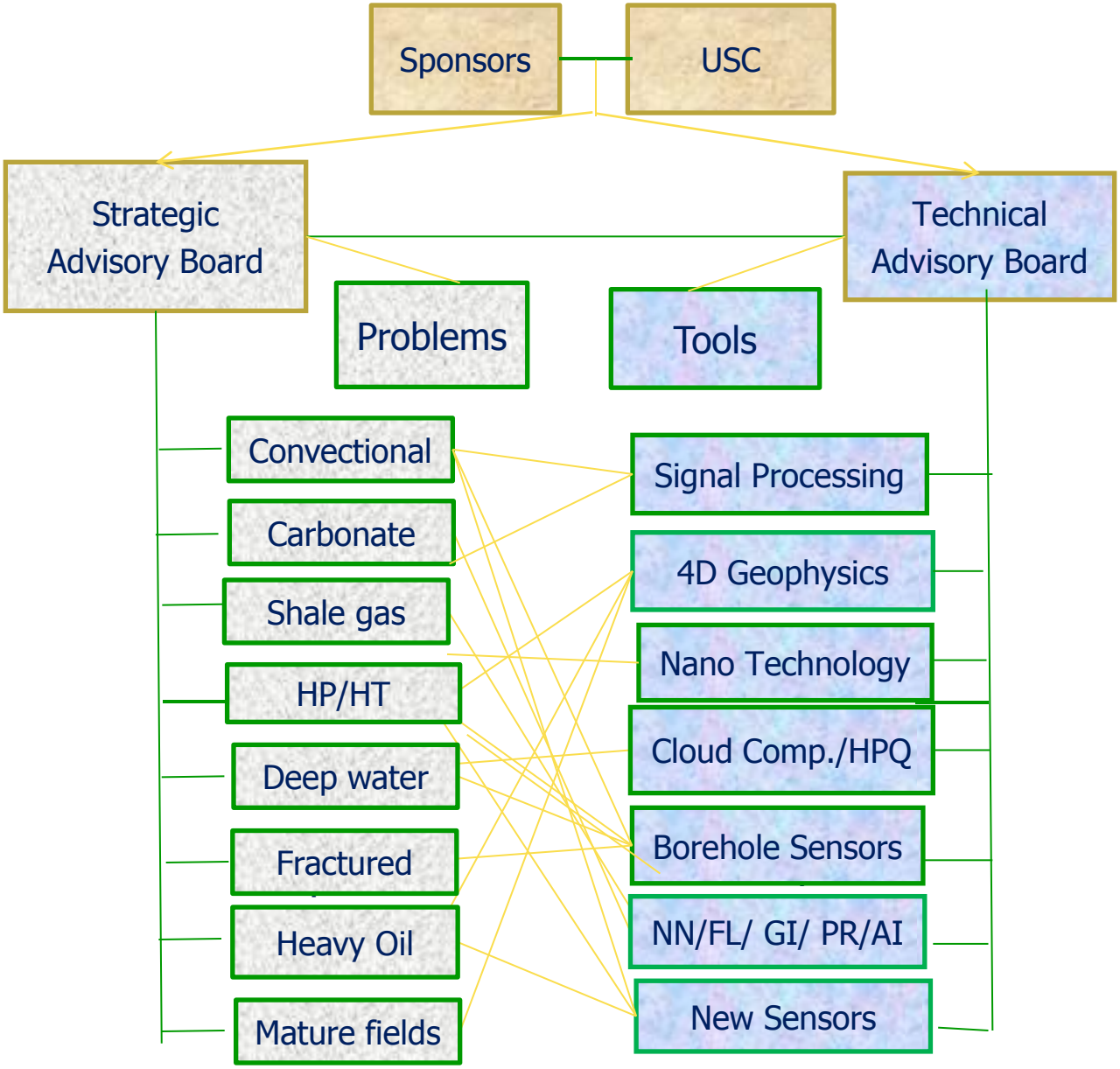

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Project Portfolio

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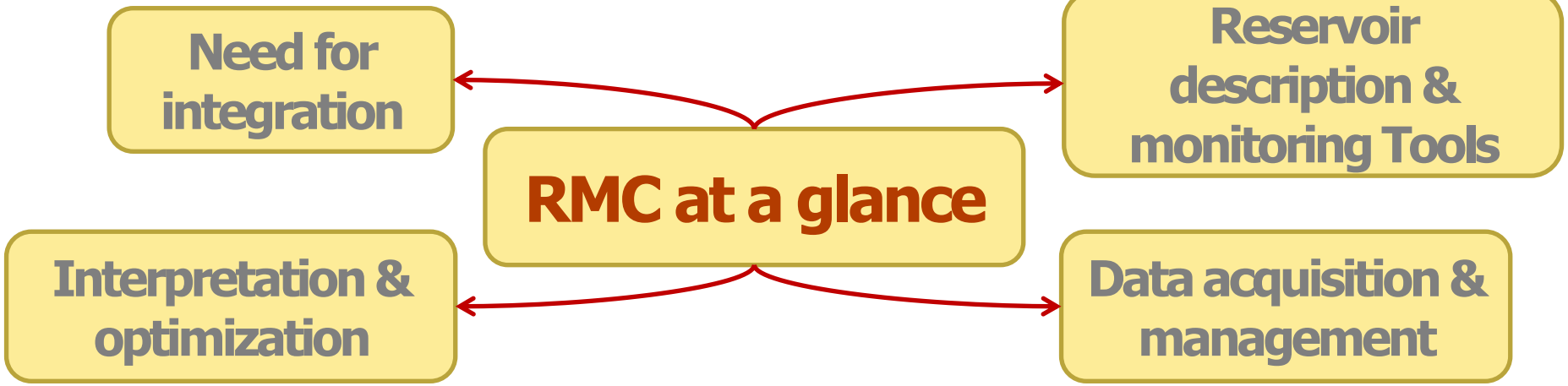

Integrated Reservoir Management	MEQ & Seismic Integration for Shale Reservoirs	Optimize Hydraulic fracturing for shale	MEQ to map Reservoir Structure
Inverse Modeling for RM	Feature-Based Reservoir Characterization	Physical Models to monitor reservoir fluid	Reservoir Continuity
Numerical Model Perturbations for RM	Fractured Reservoir Modeling	Nano-Particles to probe / monitor reservoir	Time lapse Petrophysics for RM
Up-scaling for compositional simulation - EOR	Electromagnetics for RM	Data Management for RM	Underwater Acoustic Communication

Project Portfolio Prioritization

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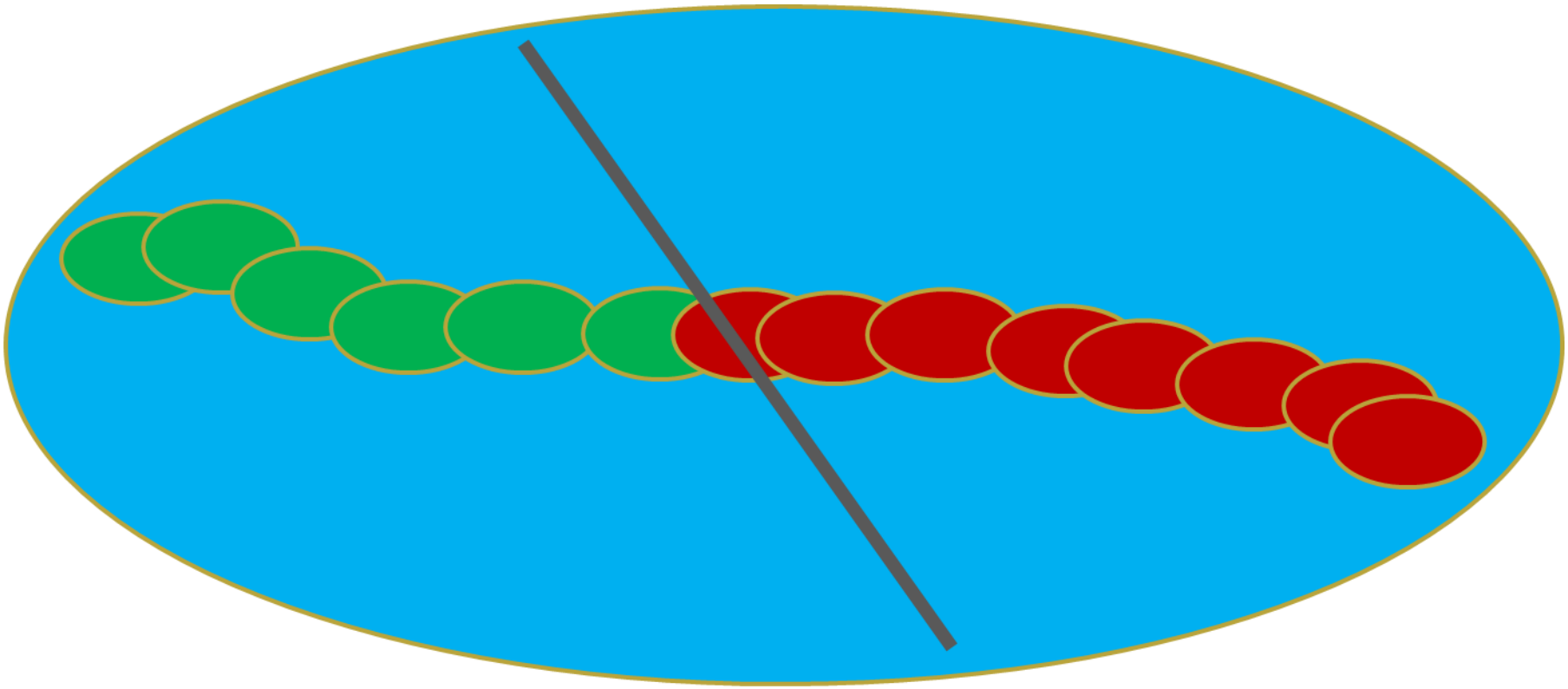
Much like Prospect Ranking or CAPEX Allocation



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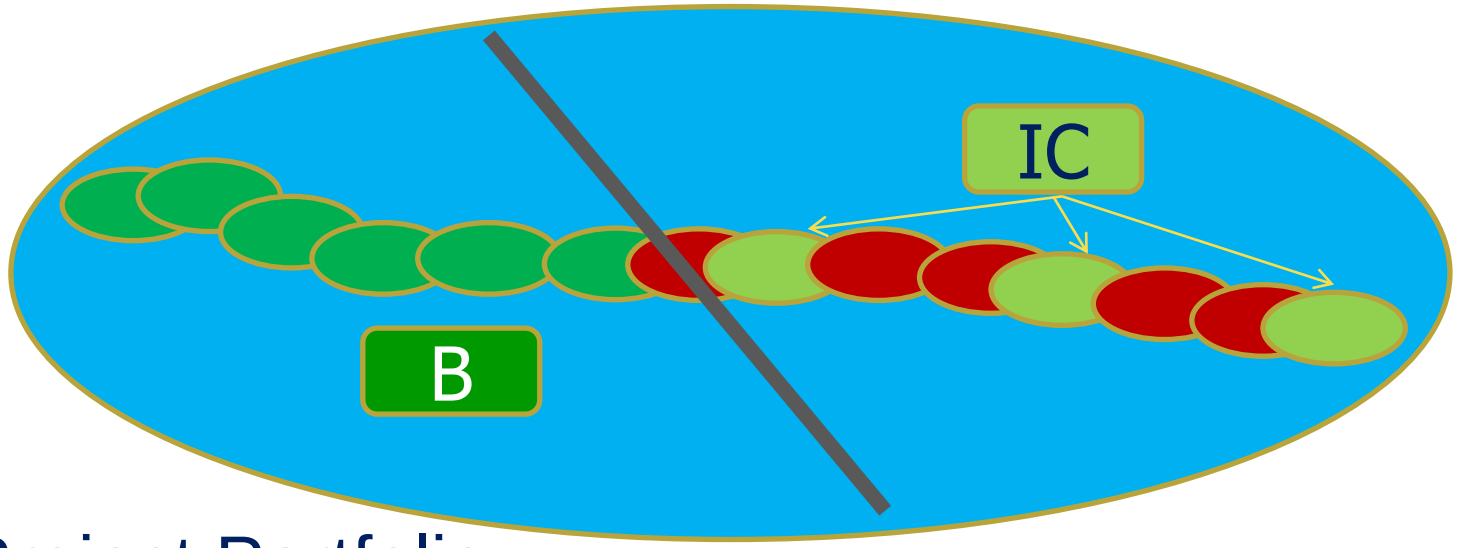
Project Funding



Proposed Project Portfolio

$PPP_1, PPP_2, \ldots PPP_m$

Selected Portfolio with group ranking (Base Funding)

$B_1, B_2, \ldots\ldots\ldots B_n$

High ranked projects by Individual Companies

$IC_1, IC_2, \ldots\ldots\ldots IC_m$

Brain Storming & Panel Discussion

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- **Brain Storming Sessions**
  - What are the key practical challenges on RM
  - What are the important tools with most promise for RM
  - How to set priorities and the metrics to use for project ranking

- **Brain Storming Sessions**
  - How RMC should evolve?
  - Where do we go from here?