CSRC Industry Academic Interaction

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Motivation

SDSU benefits	Industry benefits
Expose students to "real-world" problems	*Source of well-trained new employees*
Additional source of support for students	*Access to specialized academic firepower and resources*

Resources

- Wide range of faculty from mathematics, science, and engineering spanning a variety of specialties (fluid dynamics, materials science, biophysics, bioinformatics, signal processing, chemistry, physics, astronomy, data mining, computational and numerical expertise)
- Ph.D, M.S., and (next year) B.S. students
- Computational resources (e.g. cluster, visualization)

Methodology

- Industry participation at weekly colloquium and other events. (no cost to industry)
- Develop classes designed to meet industry needs (enhance teamwork, problem-solving, and communication skills) (no cost to industry)
- Provide access to faculty/student teams for specific problems ($)
- Develop focused consortiums with multiple faculty and associated students ($)

Examples: Colloquium

- Industry representatives deliver weekly presentations to CSRC students and faculty.
  - Share information about your business.
  - Generate interest for your projects.
  - Meet CSRC members to experience their expertise in your field and learn about SDSU resources.

Examples: Projects Class

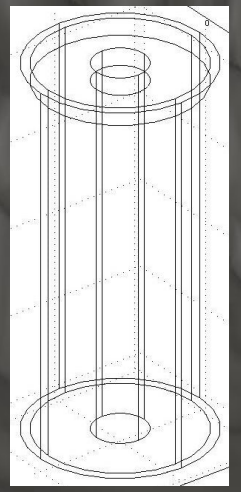
- Problems in Computation Sciences (COMP670)
  - Intended to mimic industry environment
  - Small group of students address a specific problem and write report
  - Industry sponsor and faculty act as consultants
  - Enhance teamwork and flexibility
  - Objectives based in part on previous comments during ACSESS meetings

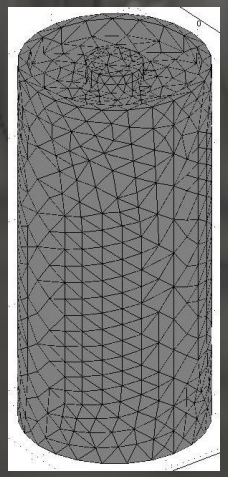
Examples: Projects Class

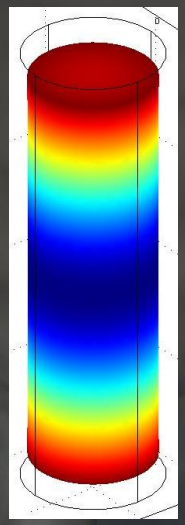
- Previous COMP670 projects
  - Time series analysis and signal detection in noise.
  - Earthquake localization.
  - Numerical modeling of sintering
  - Analysis of customers preferences (Netflix)
  - Visualization of protein molecules
  - We accept problems from industry (no charge)

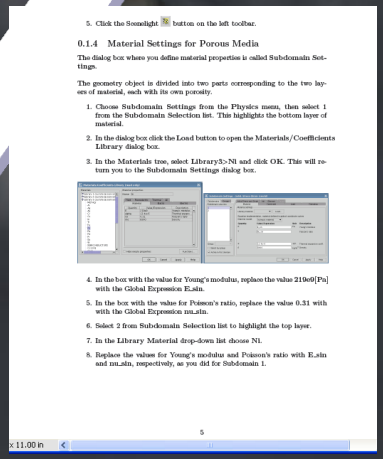
Examples: Sintering

- Tasks:
  - Solve sintering problem using finite element software
  - Write documentation
  - Presentation
    - (powerpoint & poster*)









5. Click the Somelight button on the left toolbar.

0.1.4 Material Settings for Porous Media

The dialog box where you define material properties is called Subdomain Settings.

The geometry object is divided into two parts corresponding to the two layers of material, each with its own porosity.

1. Choose Subdomain Settings from the Physics menu, then select 1 from the Subdomain Selection list. This highlights the bottom layer of material.
2. In the dialog box click the Load button to open the Materials/Coefficients Library dialog box.
3. In the Materials tree, select Library3>Ni and click OK. This will return you to the Subdomain Settings dialog box.

4. In the box with the value for Young's modulus, replace the value 210e9[Pa] with the Global Expression E_sln.
5. In the box with the value for Poisson's ratio, replace the value 0.31 with with the Global Expression nu_sln.
6. Select 2 from Subdomain Selection list to highlight the top layer.
7. In the Library Material drop-down list choose Ni.
8. Replace the values for Young's modulus and Poisson's ratio with E_sln and nu_sln, respectively, as you did for Subdomain 1.

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Images courtesy of
M. Abouali
C. Garcia
R. Schmieder
S. Akhter
B. Runyan
D. Torres

Examples: Custom Classes

- Masters program developed in collaboration with Qualcomm.
  - Designed specifically for Qualcomm.
  - Qualcomm issues addressed in classes.
  - Qualcomm related projects.
  - Meets the needs of employees at work site.

Examples: Team Projects

- Provide support for a specific student(s) to work on a problem.
  - Includes some allocation for faculty and computer resources.
  - May form part of a student thesis
  - One summer ~ $10,000

Examples: Consortium

- Research on a given problem supported by yearly fees (for example, seismic wave imaging).
  - Gain access to latest results and codes.
  - Yearly workshop to show results.
  - Typically with a group of companies.

Conclusions

- Industry participation is essential for success.
- Participation benefits industry.
- Many participation options with considerable flexibility.
- Contact me with questions or comments

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