Course concept

• Combination:
  – Lectures on computer-integrated surgery and related subjects by instructor, guests
  – Projects
  – Seminar on current research

• Similar material to 600.445, but with greater depth & implementation focus

• Prerequisite: 600.445 or my consent
Course Numbers and Credits

• 600.446 (3 credits)
  – Full course (lecture/seminar + project)
  – Advanced undergrads or grad students
• 600.646 (3 credits)
  – Same as 600.446 but intended for grad students doing more advanced projects
• 600.452 (1 credit)
  – Seminar only
Contact Information

- TA = Xiaofeng Liu (xfliu@cs.jhu.edu)
- Office Hours = Thursday 2:30/4:00

- My office hours
  - By appointment (see Jen in NEB 315)
  - Will usually try to be in office 12-1 on class days

- My lab meeting is Wed. 1:30-2:45
- ERC Seminars Wed. 12-1:30 (lunch provided)
Grades

• 600.446/646
  – 25 % seminar presentation/writeup
  – 15 % project plan
  – 10 % project checkpoint presentation
  – 10 % project final presentation (poster presentation)
  – 40 % project implementation & final report

• 600.452
  – Letter grade or Pass/Fail
  – Grade based on seminar presentation & critical summary of pertinent research papers
Date conflicts

• I will be out of town
  – 3/25-26; 4/22
  – Possibly 3/19, but plan to travel from meeting to be here
  – Possibly other dates later in year

• We need to find make-up dates
  – Pick an evening (e.g., 5-7pm) or dawn (7-8am)
  – Evenings preferred
Seminar Presentations

- Select a single important paper or series of papers (2-5) relevant to your project or other interest
- Give short (typically, 20 minutes) talk
  - Critical summary of what paper says & its significance
- Bring hard copy of presentation materials to class to be put in your notebook
- Also, write a short (3-5 page) critical review
  - Due day before talk (give to my secretary for copying and distribution)
  - Will be flexible on due date for the first talks
- Copy of paper will go into your notebook & one to me
- Will be critiqued in class (in a friendly way)
Typical Outline (modify as appropriate)

• 1 slide statement of your project
• Paper selection and why
• Summary of problem & key result
• Significance of key result
• Necessary background
• Description of what the author(s) actually did
  – Theory, experiment, etc.
• Your assessment
  – Importance, relevance to you, good & bad points, etc.
  – Possible next steps for this work
• Conclusions
Rough Calendar

• 1/31; 2/5-6: Discuss projects in class
• Pick project & seminar topics by 2/15
• Approved project proposals by 2/22
• Project plan presentations 2/22 through mid March
• Paper seminars March through April
• Project checkpoints mid-March through April
• Project poster session early May
• Project final reports by 5/11(subject to confirmation)
Projects

• Typically will involve some substantial implementation/experimentation component
• Require a “mentor”
  – Me, colleague, or an end user
• Require funding/equipment support
  – Can come from me or end user
• Require a defined plan and budget
• Team projects encouraged
Project Notebooks

• Maintain a loose-leaf notebook with dividers
• One copy for me (keep in my secretary’s office); at least one copy for you
• Divide into sections
• Sections for project proposal, all presentations, copies of background material, final report, etc.
• A place for me to keep grade record
Project Proposals

• Topic by 2/15; “Closed” plan by 2/22 or before
• Approximately 3 page summary containing
  – Stated topic
  – Team members, mentor
  – **Short** statement of relevance/importance
  – List of “deliverables” (min, expected, max)
  – **Short** technical summary of approach
  – Key dates & assigned responsibilities
  – List of dependencies
  – Reading list
Project Checkpoint Presentation

- Approximately 20 minutes talk
- Given in late March, early April
- Summarize/update plan material
- Present work to date
- Present problems, exposures, dependencies
- Bring hard copy of presentation materials to class to be put in your notebook
- Will be critiqued in class (in a friendly way)
Project Final Presentation (Poster)

- Near end of semester
- Standard format
- Project should be done or nearly so
- Present/demo results
- Discuss work remaining to be done
- Discuss significance of work

- Discuss lessons learned
- Prizes awarded in various categories
Project Final Report

• Technical summary
  – Similar to a short conference paper
  – Explain background, problem, approach, results, significance, etc.

• Management summary (1 page)
  – Who did what
  – Discuss what was accomplished vs planned
  – Discuss what might be next

• Technical appendices
  – Code, user’s manual, etc.
Possible projects (examples)

- Construction and extension of statistical atlases of bony anatomy (RHT)
- Measure EM tracker distortion in different environments (RHT)
- Evaluation of tool motion in DaVinci using EM tracker (RHT)
- Calibrating (stereo)endoscopes for DaVinci (Hager)
- Stereo vision algorithm implementation & benchmarking (Hager)
- Interactive environment for surgical robots (RHT/kazanzides)
- Cooperative manipulation for robotically-assisted ultrasonography (RHT)
- Stereo visualization & performance tests with DaVinci (Marohn, Hanly)
- Smart sensors for surgical retractors (Talamini)
- iTK-based cartilage segmentation from CT (Armand, RHT)
- iTK-based liver tumor segmentation from CT (Cleary)
- Liver motion analysis under MRI (Cleary)
- RF ablation treatment planning (Cleary, strong possible Choti tie-in)
- Fluoroscopy calibration (Cleary)