Educational Demonstration

- Develop a MEMS demonstration device to teach an engineering or scientific concept unique to this scale
  - with pad layout, operation and testing plan to enable in-class demonstration
  - Consider how Class-on-a-chip might be used effectively in the class
- Create a lesson plan and educational presentation about that device and the principles it teaches
  - What is it about this scale that particularly enables this device function?
  - What are the engineering gotchas that need to be considered due to scale?
- Judging will be based upon the effectiveness of the device and the presentation to communicate the scaling principle to students
- Maximum # of slides = 20
- Submit plan in pdf; presentation in ppt formats
- Submit CAD design file in GDSII format (use linkcad free trial to convert from dxf to GDSII)

Educational Demonstration

- Educational Value (25%)
  - How engaging the device would be to the target audience
  - Strength of applied scaling theory
  - How conducive is the design for use with Class-on-a-chip?

- Create a lesson plan that includes (50%)
  - Proposed learning outcomes
  - Device operation and testing instructions
  - Proposed lab measurements and sample experiments
  - Suggested instruction and teaching methods
  - References

- Create a presentation that includes (25%)
  - Introduction and Background
  - How device works conceptually
  - Applications: Why is this relevant?
  - Scaling theory: what physics are dominant at macro vs. micro scale
  - Engineering drawings
  - Computer modeling and simulation

Educational Value (25%)

- How engaging the device would be to the target audience
  - Visual appeal under microscope
  - Understandable and engaging applications of the device and scaling principle
- Strength of applied scaling theory
  - How clearly does the concept teach and demonstrate the scaling principle?
- How conducive is the design for use with Class-on-a-chip?
  - Ability to take measurements of the device
  - Ability to fit the data to theory

Create a lesson plan (50%)

- Proposed learning outcomes
  - Depth of student's understanding about the scaling principle after classroom instruction and using device in the lab and their ability to apply scaling principle to other devices.
- Device operation and testing instructions
  - Clear, step by step instructions of applied power, frequency, and measurements
- Proposed lab measurements and sample experiments
  - Ability to take data and measurements in a classroom/lab setting
  - Potential of experiments to demonstrate scaling principle
- Suggested instruction and teaching methods
  - Quality, clarity, and thoroughness of teaching materials supplied to assist the professor with classroom instruction
- References
  - Number and quality of references in describing supporting theory and applications of scaling principle

Create a presentation (25%)

- Introduction and Background
  - How well does the author introduce the scaling principle at both the macro and micro scale?
- How device works conceptually
  - Quality and clarity of drawings and text explaining working device and system at a conceptual level
  - How well does the approach/design teach the scaling principle?
- Applications: Why is this relevant?
  - Current and potential applications of scaling principle
  - Importance of scaling principle as gauged by its applications
- Scaling theory: what physics are dominant at macro vs. micro scale
  - Thoroughness of theory and calculations comparing scaling principle at macro and micro levels
- Engineering drawings
  - Clarity of images and explanations of CAD drawings demonstrating MEMS device layout, layers, and dimensions
- Computer modeling and simulation
  - How well do modeling results prove functionality of important or novel components of the device?
  - Relevance of graphs or simulated images showing predicted device operation