Course: EE 428/528 BioMEMS & Lab-On-a-Chip (LOC) (Fall 2018)

Objectives:
- Course Learning Objectives:
  - By the end of the course, students should be able to:
    - Review BioMEMS fabrication
    - Identify immunization issues on life sciences
    - Demonstrate creative solutions at the interface of biology and technology

Reviews:
- Senior undergraduate or graduate standing in engineering, medicine, biomedical sciences, and natural sciences

Prerequisites:
- Fall 2018, M/W, 12:30 PM - 1:50 PM, KNOX 14
- Prof. Kwang W. Oh, Ph.D. (kwangoh@buffalo.edu)
- SMALL (Sensors and Micro/Actuators Learning Lab), http://SMALL.buffalo.edu

Time/Location:
- Department of Electrical Engineering/Department of Biomedical Engineering, SUNY at Buffalo
- 113 C Davis Hall, North Campus, Buffalo, NY 14260

Office Hours:
- Mon 11-11:50 & Wed 10-11:50, right before after the class; or by appointment; I usually have one to one conversations on any topics (e.g., course materials, research opportunities, your presentation ideas, career development, even your own personal matters, ...). Taking advantage of office hours is your privilege.

Schedule:
- Fall 2018, M/W, 12:30 PM - 1:50 PM, KNOX 14
- Prof. Kwang W. Oh, Ph.D. (kwangoh@buffalo.edu)
- SMALL (Sensors and Micro/Actuators Learning Lab), http://SMALL.buffalo.edu

Presentation:
- Fall 2018, M/W, 12:30 PM - 1:50 PM, KNOX 14
- Prof. Kwang W. Oh, Ph.D. (kwangoh@buffalo.edu)
- SMALL (Sensors and Micro/Actuators Learning Lab), http://SMALL.buffalo.edu

Grading:
- Professionalism/Attendance: 10% (if you miss one lecture, deduct 0.5%)
- Presentation 1 (4-min): 25%
- Presentation 2 (6-min): 30%
- Final Exam (80-min): 25%

Textbooks:
- Class notes and Handouts (see UBLearns)
- TA: Anyang Wang (anyangwa@buffalo.edu), Office Hours: M/W 2-4 pm, 233 Davis Hall, by appointment

Presentations:
- Send your presentation files (ppt's and embedded video clips) to "kwangoh@buffalo.edu" with a title "EE 428/528" title or "EE 528" from your buffalo.edu e-mail account at least by 10:00 am on your presentation date.

Assignment:
- A. Presentation 1 (4-min): Students will present their works, exactly 4 min long. Pick one random noun from a dictionary. The noun must begin with the same letter that begins your last, middle or first name. For example, Kwang W. Oh would choose nouns that begin with the letter "K", "W", or "O". Now, add micro-, nano-, or bio- to the beginning of the noun, and speculate on any potential usefulness of the technology or application. Remind that you have to present innovative, creative, practical ideas that someone has not proposed yet to the world. The presentation structure could be as follows:
  1. Your unique approach/design/solution. You must show your own sketch/drawing/schematic of your proposed idea. Hand-drawing is okay. If you don’t know how to visualize any details, you have no idea what you are proposing.
  2. What are the technical challenges and potential solutions to realize the proposed idea?
  3. Detailed plan to challenge/solve the idea

B. Presentation 2 (6-min): All students present the following assignments, approximately 6 min long. Pick one COMPANY and research their MICROFLUIDIC PLATFORM TECHNOLOGY. For example, a company named "Silicon Biosciences" developed a new microfluidic platform technology called "Optimiser" [http://siliconbio.com/optimiser/platform_technology]. Then, briefly explain the principle of their technology introduced in the website(s) + research article(s) + US patent(s) ([https://patents.google.com]). After that, come up with a solution(s) of a device/system/application that the students might think works better than existing solutions. The presentation structure could be as follows:
  1. Summary description of the technology (company name, website, research papers, patents, ...)
  2. Pros and Cons in their technology. You have to discuss these in details and please be specific, not be general.
  3. What is your unique approach/design/solution to overcome the Cons?
  4. What are the technical challenges and potential solutions to realize the proposed idea?
  5. Detailed plan to challenge/solve the idea
  6. Conclusion and impact (so what?)

- Please list all references in EACH presentation page if they (photos, images, ideas, data, ...) are not from your own ones. Do not list all on the last page!!
- The grading (instructor: 50%, students: 50%) for the two presentations will be based on:
  1. The uniqueness and Originality of your selections (40%). Is the proposed idea unique and original? Did he/she propose it for the first time as far as you know? Is it really useful in some applications? Please google/search articles, journals, patents, products, ... if someone already did the thing you propose or not.
  2. Realistic and detailed approach (30%): Are there enough discussions on challenges and solutions to be able to make/collaborate/realize the idea? The topic should be "narrow and specific". I don’t want to hear broad ideas or concepts. You can hand-draw your proposed idea as detailed as possible.
  3. Presentation skills (presentation structure, easy understanding, reference, exact 4-min or 6-min length, questions/answer score (30%): Does he/she follow the suggested presentation structure? Does he/she entertain, inform, persuade, and/or sell the proposed idea effectively within the given time (4-min or 6-min)?

- You have to convince your idea to students and of course entertain them too.

- The schedule is subject to change and changes to the published schedule will be announced in class. Schedule for the two presentations will be announced.