

EMBEDDED ENTREPRENEURSHIP EDUCATION MODEL

Course Hosted/anchored: iNANO

STATUS: Course Approved and Piloted



Materials-Entrepreneurship

iNANO
Chem
Phys
Geo
CS

Course name: Trends in Nanoscience, Communication & Entrepreneurship

MBG/Bioscience

STATUS: Course Under Design – for 2019 launch



Bio-Entrepreneurship

MBG
Biologi
Mol.Med
Food
CS

Course name: Not decided yet...

CS

STATUS: Course Approved – & piloted.



Digi-Entrepreneurship

CS
Food
Math

Course name: Interdisciplinary Digital Entrepreneurship

5 ECTS



5 ECTS

Science Deep-Dive

Entrepreneurship

All courses are 10 ECTS

Course objectives – nanoscience

At the end of the course the students are expected to be able to:

- Acquire knowledge about a specific scientific theme by reading, searching and identifying relevant original literature within nanoscience or nanotechnology
- Independently organize, prepare and present a colloquium talk.
- Analyze opportunities for entrepreneurship and plan implementation in a business setting based on the acquired scientific knowledge.
- Communicate science and business objectives to any type of audience – experts, non-experts, investors, grant-providers.
- Explain and compare the presented theories of innovation and entrepreneurship.
- Reflect on the overall process and be adept at understanding the value of business models as well as innovation within a scientific arena.

Nanoscience Scientific Themes

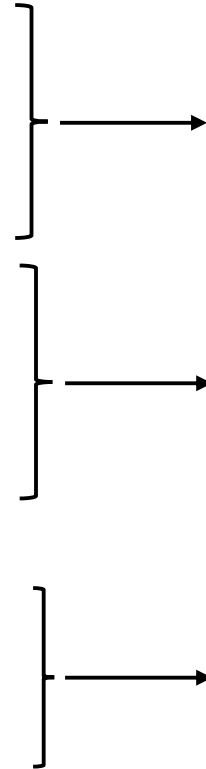
Advisors Supervisors/Sub-Themes

Torben Jensen "Metal hydrides"
 Jeppe Vang "Catalysis"
 Elena Ferapontova "Energy conversion"
 Arne Nylandsted Larsen "Solar cells"
 Stefan Wendt "Alternative fuel production methods"

Duncan Sutherland "Plasmonically active surfaces"
 Mingdong Dong "Molecular self-assembly"
 Steen Uttrup Pedersen "Electrochemical Surface modification of Graphene"
 Kim Daasbjerg "Surface immobilized polymer brushes; from fundamental research to industrial application"

Brigitte Stadler "Novel nanoparticles for drug delivery"
 Ebbe Sloth Andersen "Nucleic-acid biosensors"
 Jørgen Kjems "Self-assemble nanoscaffold-based drugs"
 Thomas Vorup Jensen "Nanoparticle anti-inflammatory adjuvants"
 Morten Foss "Surface cues to steer cellular response"

3 Themes



Group Individual Colloquial Presentation Columns

Track A (Teams* 1, 3 5)

**Energy storage/
Materials**
 5 students/
 5 sub-themes 1

**Functional
Surfaces**
 4 students/
 4 sub-themes 3

Nanomedicine
 5 students/
 5 sub-themes 5

Track B (Teams* 2, 4 6)

**Energy storage/
Materials**
 5 students/
 5 sub-themes 2

**Functional
Surfaces**
 4 students/
 4 sub-themes 4

Nanomedicine
 4 students/
 4 sub-themes 6

* **Teams** are Entrepreneurial Teams that will pick ONE specific problem for the subsequent Entrepreneurial process

SG-1
Teams 1 & 2

SG-2
Teams 3 & 4

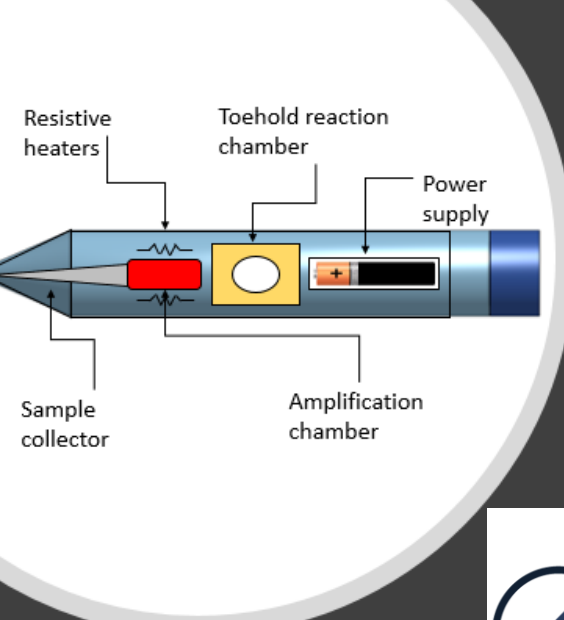
SG-3
Teams 5 & 6

Study-group Rows

Study groups – just share and brainstorm scientific concepts with each other


Example of Ideas

Ideas rated positively by Industry experts

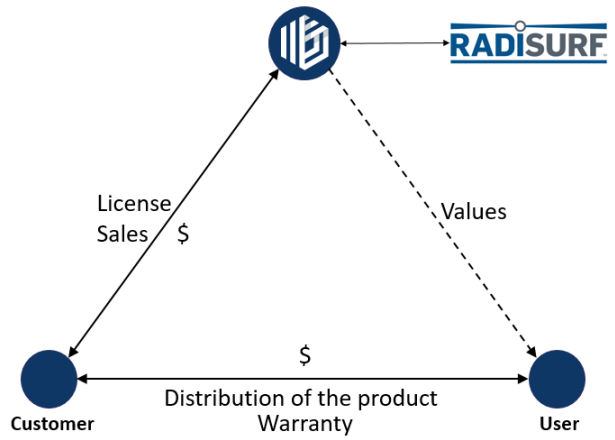


The Cancer Crayon

- Utilizing shredded cancer DNA
- Concept has been proved to work with zika-virus
 - Fast
 - Accurate
 - Sensitive
- Results after 4 hours

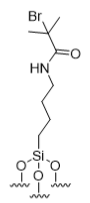



Simon Asp, Youssif Merhi, Rikke Hansen & Andreas B. Laursen



Materials

- Initiator:
- Polymer brush: monomer + copper catalysator
- Polymer layer: monomer + TiO₂ particles + copper particles
- SET-LRP polymerization



1st Embedded model pilot (2018) – RESULTS

- 26 students signed up – 2 dropped out (due to other reasons)
- Strong resistance from students due to mandatory sign-up but resistance was found to be BOTH in the Colloquium part AND the Entrepreneurship part
- Course Evaluations (run 2 weeks prior to course end)- rate the course as moderate outcome on learning BUT **extremely positive AFTER course** end as seen in written student reflections
- Feedback session with students held in November this year – suggested that students like the course but wanted more independence on choosing the scientific topics + more upfront knowledge on WHY Entrepreneurship is relevant (they got this after the course but having it in the start and continually will keep them engaged in an otherwise out-of-their-comfort-zone course).
- These changes are now implemented in the 2019 course and will share results of the 2019 iteration as well

Some Example Student Reflections

This course was fun. It was hard to see, what the different things we have been doing and learning should lead too. But after finishing the final pitch, and writing this reflection, I would say that everything made more sense. I enjoyed the group work a lot. There were certain times, where I felt time pressure, especially in the beginning of the course, with the colloquium part. I ended up with actually enjoying that course a lot.

I would like to end up saying that I honestly think that there is a presence of lucrative opportunities with this product, in that specific market. Due to the time, we are in and the issue this industry is

My overall understanding of the entrepreneurial process

In the beginning I did not enjoy this process. Mainly due to a not functional group, but also due the fact that I did not see myself as the entrepreneurial type, and I was not able to see the possibilities in it, which might be a result from my family background with failed businesses. I saw entrepreneurs as a specific group of persons, which “were born” with the property of entrepreneurship, and not something that you could be taught.

Therefore, at first, I was a bit negative. But quite fast I actually started to find it very interesting. Learning that entrepreneurship is a method appealed a lot to me and opened up for a new way of thinking. As a child I was very creative, and I suddenly managed to find that in myself again, which was a positive experience. I could actually begin to see myself as an entrepreneur with some practice. As described in theory, I felt like I came out of my disclosive space and opened for a new way of thinking.

However, when that is said, I think the process would have been even better if I could be an entrepreneur within a topic that appealed more to me than Energy storage/materials does.

“It took a while before I understood what the overall meaning of the course was.”

The idea that entrepreneurial method has many similarities to scientific method, and thus can be studied and taught, appealed to me a lot.

Generally I ended up having a fine understanding of the entrepreneurial process. But it was first in the last part where we actually had to prepare for the final pitch. Therefore I did not like the first parts of the entrepreneurial processes as I could not see it in a total context. Besides that the topic we had to work with did not appeal to me and I think sometimes the time pressure also was a factor which made me dislike it.