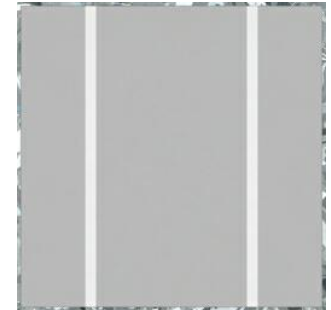
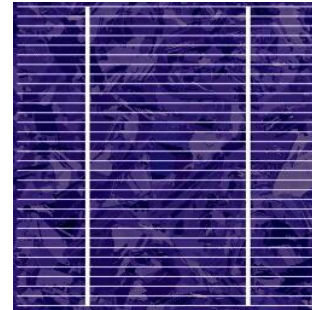


Welcome to:

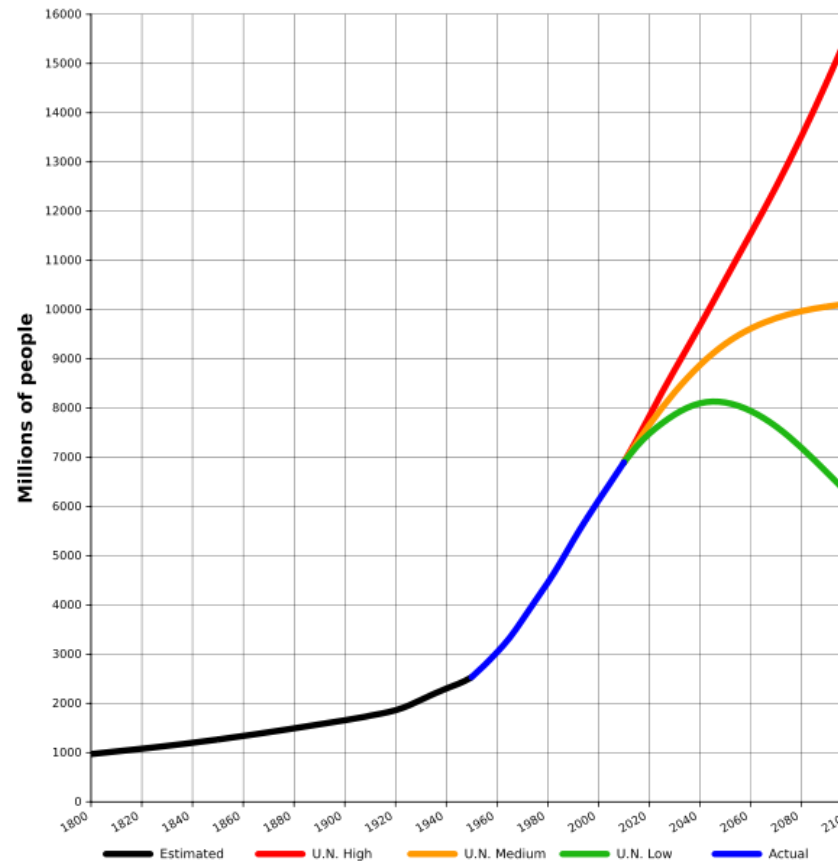
UNIK 4450/9450 – Solar cells



Clever student question:

“Why am I here?”

Answer 1: ideology and/or duty?

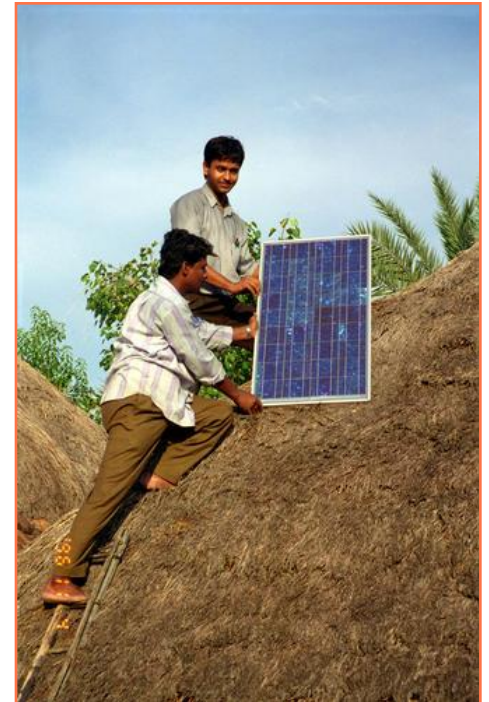


Supplying sufficient power in the future is an immense challenge!

Answer 1: ideology and/or duty?

The beauty of solar cells

- A vast, almost unexploited resource
- Renewable
- No emissions during operation
- Little or no maintenance required
- Reliable energy production
- Distributed energy production
- Increasingly low cost



~ 1.5 billion people currently live without access to reliable electricity



Answer 2: opportunity?



NorSun



REC



Prediktor 



Marstein – IFE

Answer 3: intellectual challenge?

How does a solar cell **really work**?

What is a **good** solar cell?

How **cheap** can solar electricity become?

Are solar cells really a **sustainable** solution to our challenges?

The goals of UNIK 4450/9450

1. To enable **you** to understand current and future trends and developments in photovoltaics.
2. To present **you** with a sufficient theoretical fundament for further work within photovoltaics.

THEREBY

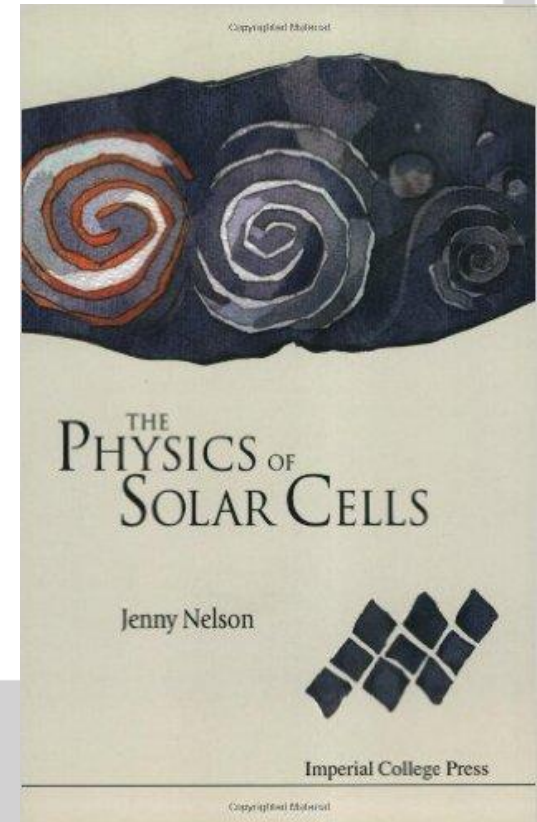
3. Educating people with the ability to make a difference!

UNIK 4450/9450 – Formalia

- Lectures
 - Wednesdays 09:15 – 11:00
 - August 28th (Doh!) to December 6th (-ish)
- Exercizes
 - Wednesdays 11:15 – 12:00

UNIK 4450/9450 – Formalia

- Curriculum
 - Jenny Nelson: “The physics of solar cells” (Imperial College Press)
 - Lecture notes
- Exam
 - Oral exam in December (Week 49/50)



UNIK 4450/9450 – Formalia

- Lecturer

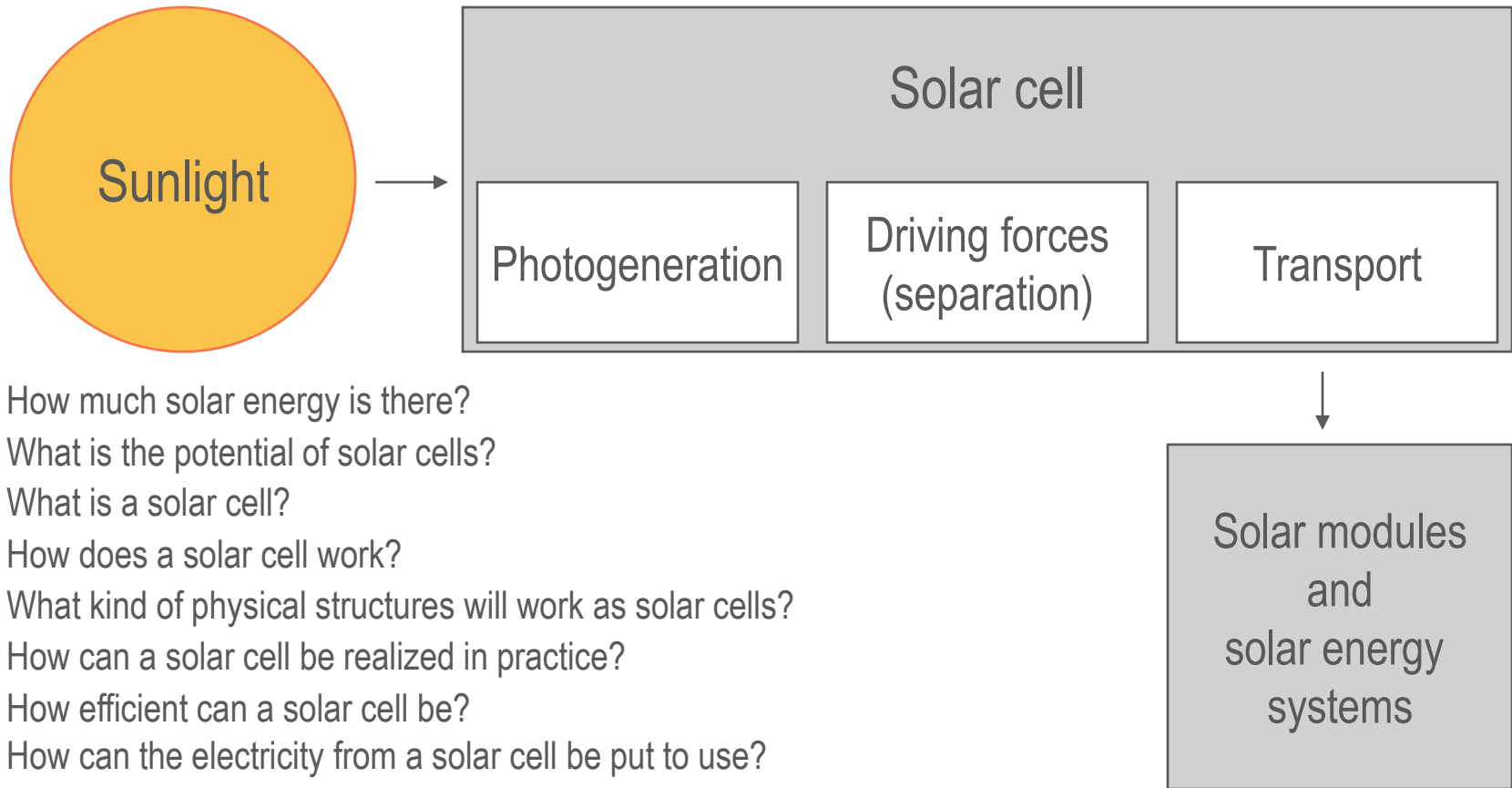
- Erik Stensrud Marstein

- Centre Director: Norwegian Research Centre for Solar Cell Technology
Research Center for Sustainable Solar Cell Technology
 - Chief scientist: IFE Solar energy department
 - Professor II: Department of Technology Systems (UiO)
 - E-mail: eriksm@ife.no
 - Tel: 90 11 77 62

UNIK 4450/9450 – Expected student participation

1. Asking questions and participating in discussions
2. Attempting to solve and present solutions to exercises
3. Presenting the results of a simulation task in PC1D
 - Cases selected to illustrate important topics
 - 10 – 15 minute presentation

What will UNIK 4450/9450 teach you?



UNIK 4450/9450 – Schedule

- 30/8 Solar cell fundamentals
- 6/9 Solar cell efficiency
- 13/9 Semiconductor theory
- 20/9 Generation
- 27/9 Recombination and lifetime
- 4/10 Silicon
- 11/10 Junctions
- 18/10 Solar cells
- 25/10 Silicon solar cells I (@IFE)
- 1/11 Silicon solar cells II
- 8/11 Light management
- 15/11 Alternative solar cells
- 29/11 Solar modules & systems
- 6/12 Q&A
- Oral exam (Week 50)

UNIK 4450/9450 – Today

- Solar energy conversion
 - Fundamental concepts
 - Sunlight
 - Solar energy conversion
- Solar cell fundamentals
 - What is a solar cell?
 - Definition of important parameters
 - Terminology
 - A brief introduction to the different solar cell technologies