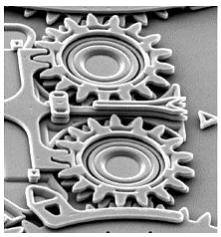
2.2.2 Other Uses of Silicon

The Obvious

- As a budding Materials Scientist and Engineer, you must have heard or read about at least two other major **Si** products. If not, do the following: i) Start reading a real newspaper and ii) Read the Science and Technology part. What you definitely should be able to come up with are.
- **Solar Cells**.
  - What do you know about solar cells? Quite a bit, actually - provided you remembered what you have learned already.
  - Let's recapitulate a few essentials you should know:
    - Maximum efficiency η and how it relates to the band gap.
    - The energy density given by the sun and how much power we can generate at high noon per $\mathbf{m^2}$.
    - The fact that we need a (**pn-**) junction to collect *minority* carriers.
    - The fact that the diffusion length ***L*** plays a major role, and that this has to do with **Si** being an indirect semiconductor
    - The ***I-U*** characteristics and how it is calculated.
    - That the only decisive parameter in the solar cell business is money.

Solar Cell

- "**MEMS**", i.e. microelectronic and micro-mechanic (and micro-optics and micro-fluidic and...) *systems*.
  - What do you know about **MEMS**? Probably not all that much from what you have learned so far.
  - **Class Exercise:** *What do you know about MEMS?*
  - To get some idea of what is going on in your immediate neighborhood in Itzehoe, check this link!



MEMS device
Courtesy of Sandia National Laboratories, SUMMiTTM Technologies, "www.mems.sandia.gov"

- We will come to these devices or components in due course. Meanwhile you can activate the link and look ahead a bit.
- Now ask yourself: **Class Exercise:** *Are there any other uses of Si you know off (or can find quickly)?*
  - Only after you pondered the questions above for some time, you should activate this link