

Zašto studirati fiziku?

Nanotehnologija u medicini



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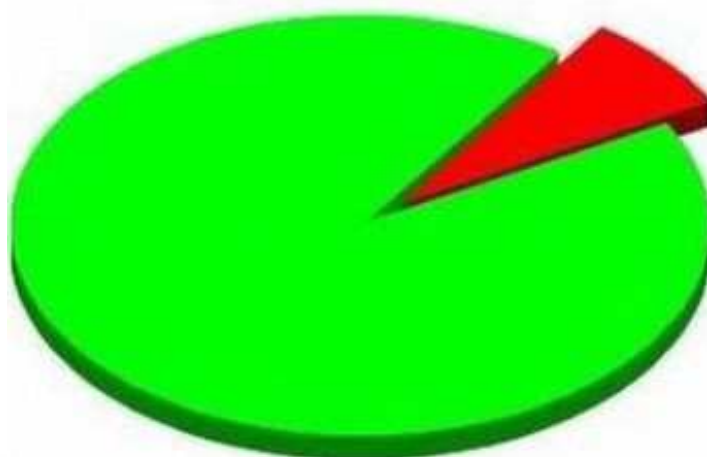


dr.sc. Sanader





Zašto baš fizika?

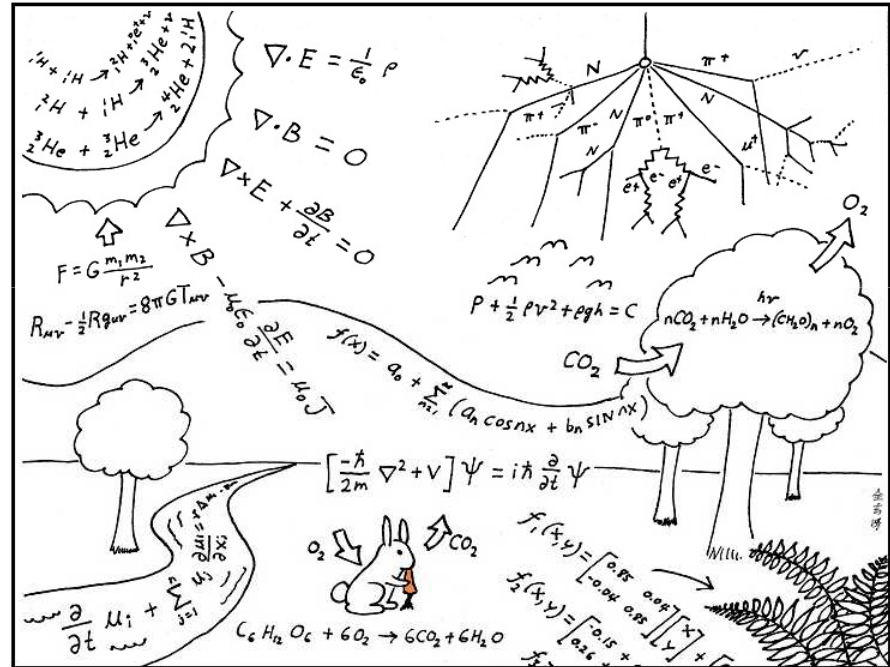
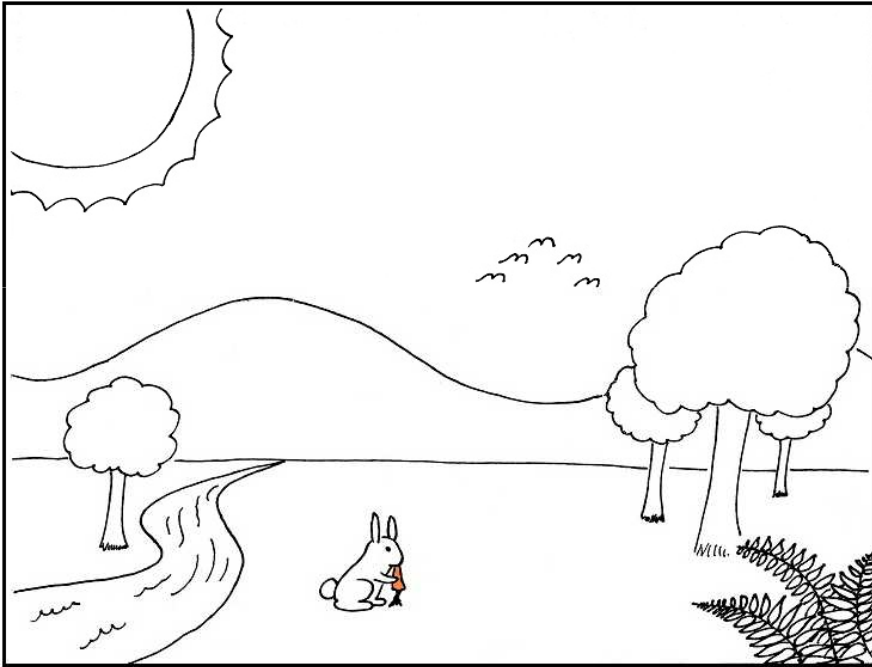


To increase mankind's understanding of the universe



To figure out how to build a lightsaber

- Znanje o svemu oko nas

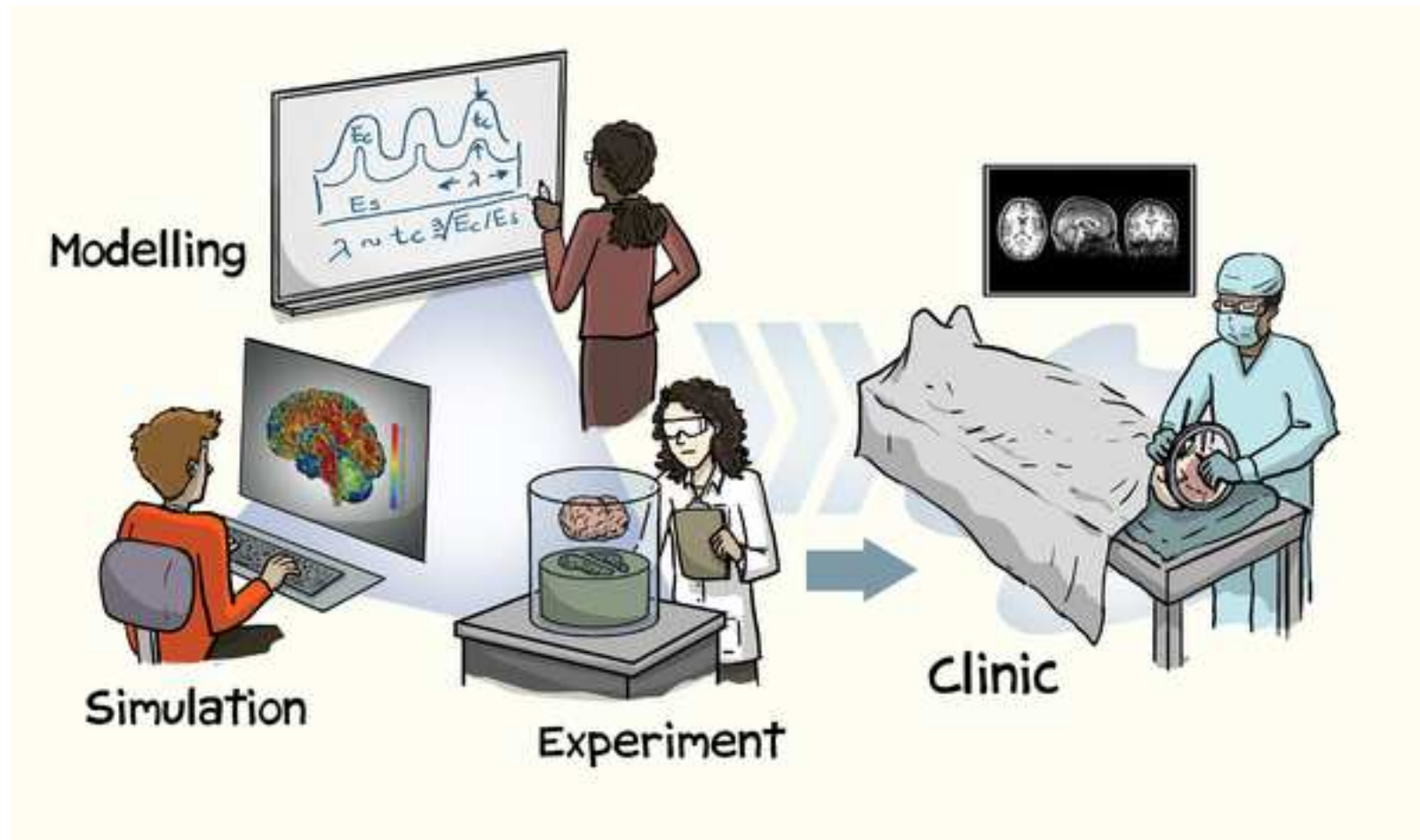


This is how scientists see the world.

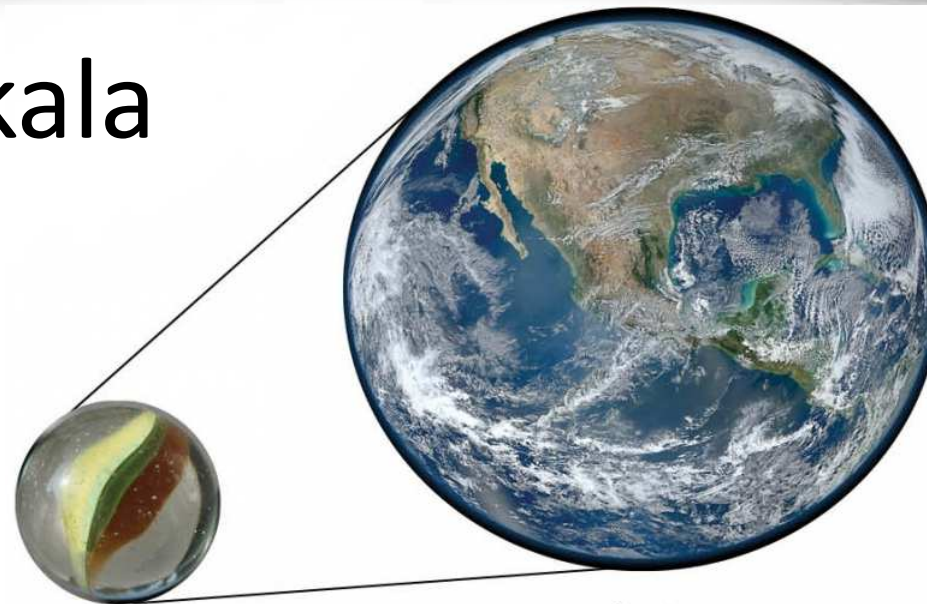
- Ali i mogućnost istraživanja potpuno novih problema!



Biofizika

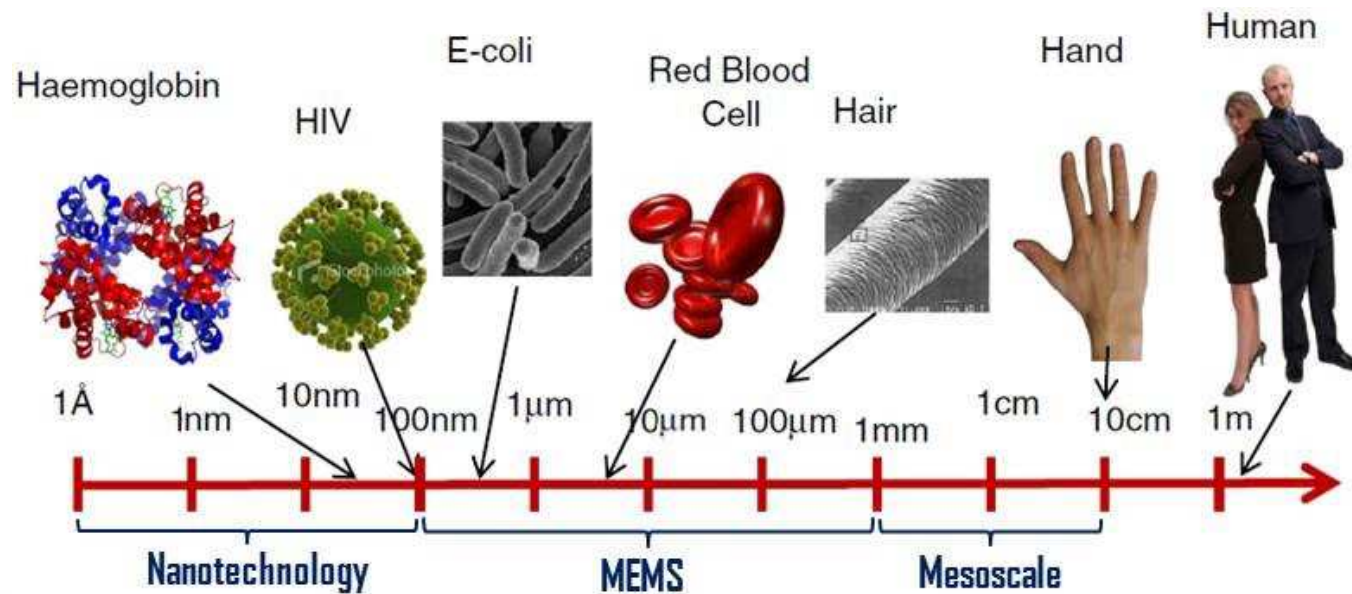


Nanoskala



1 nanometer

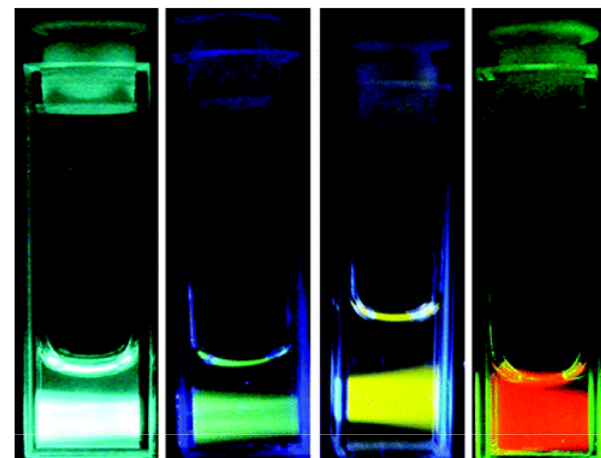
1 meter



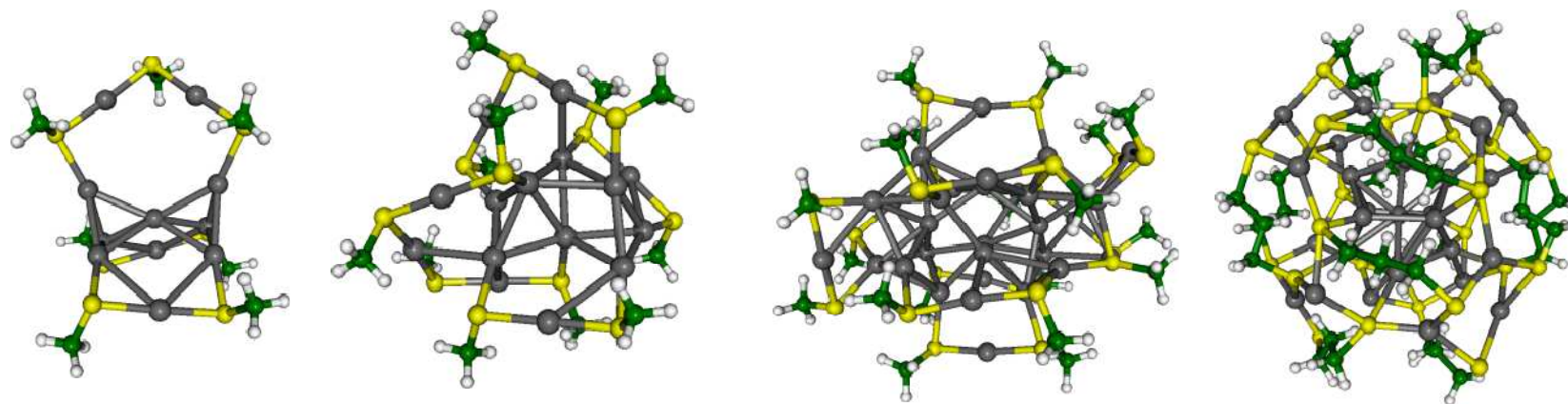


Metalni nanoklasteri

- Jezgra: Ag i Au-biokompatibilni
- Svojstva jako osjetljiva na veličinu, površinu i strukturu



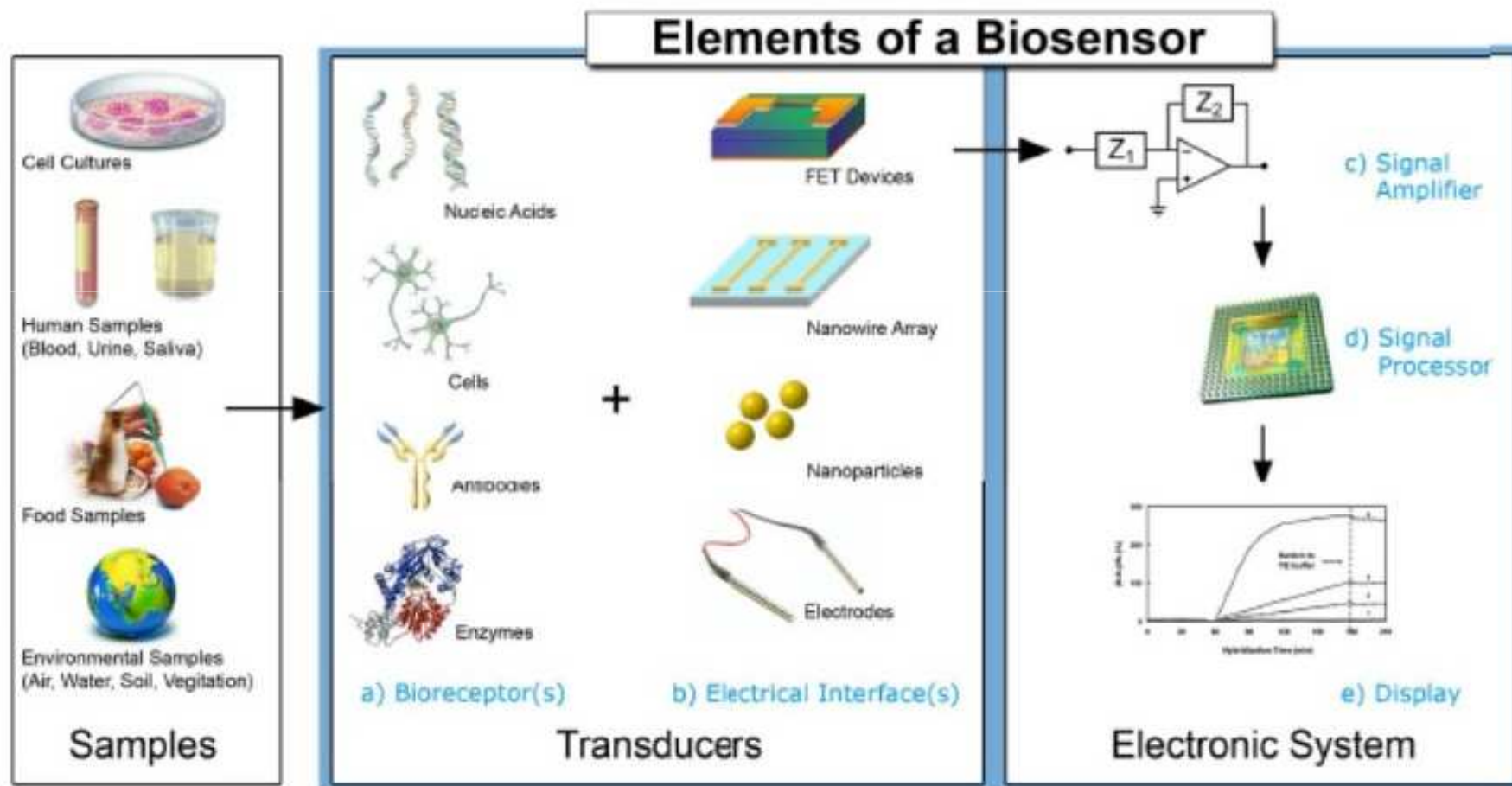
JACS, 2008, **130**, 5038





Biološka primjena

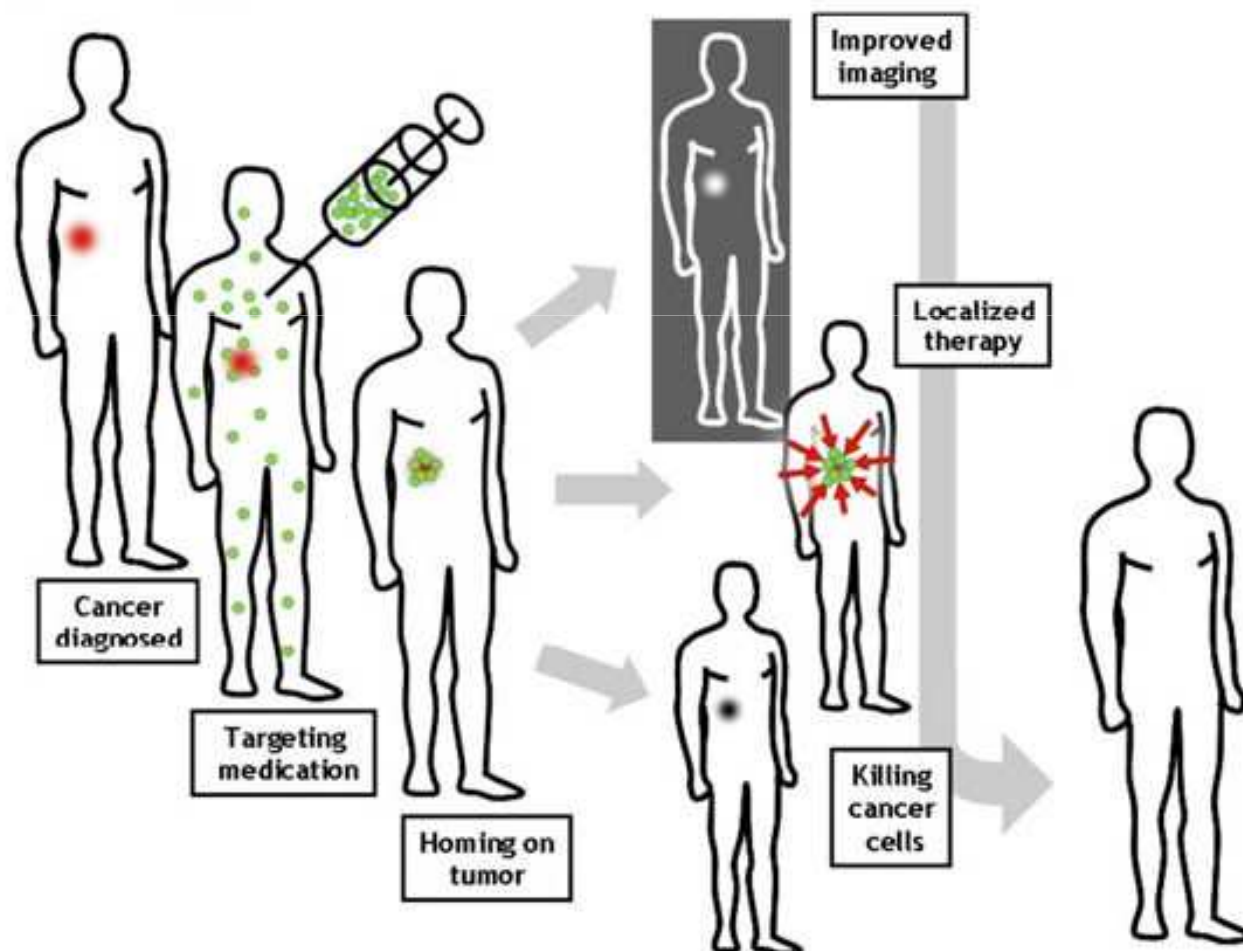
- **Biosenzorika:**





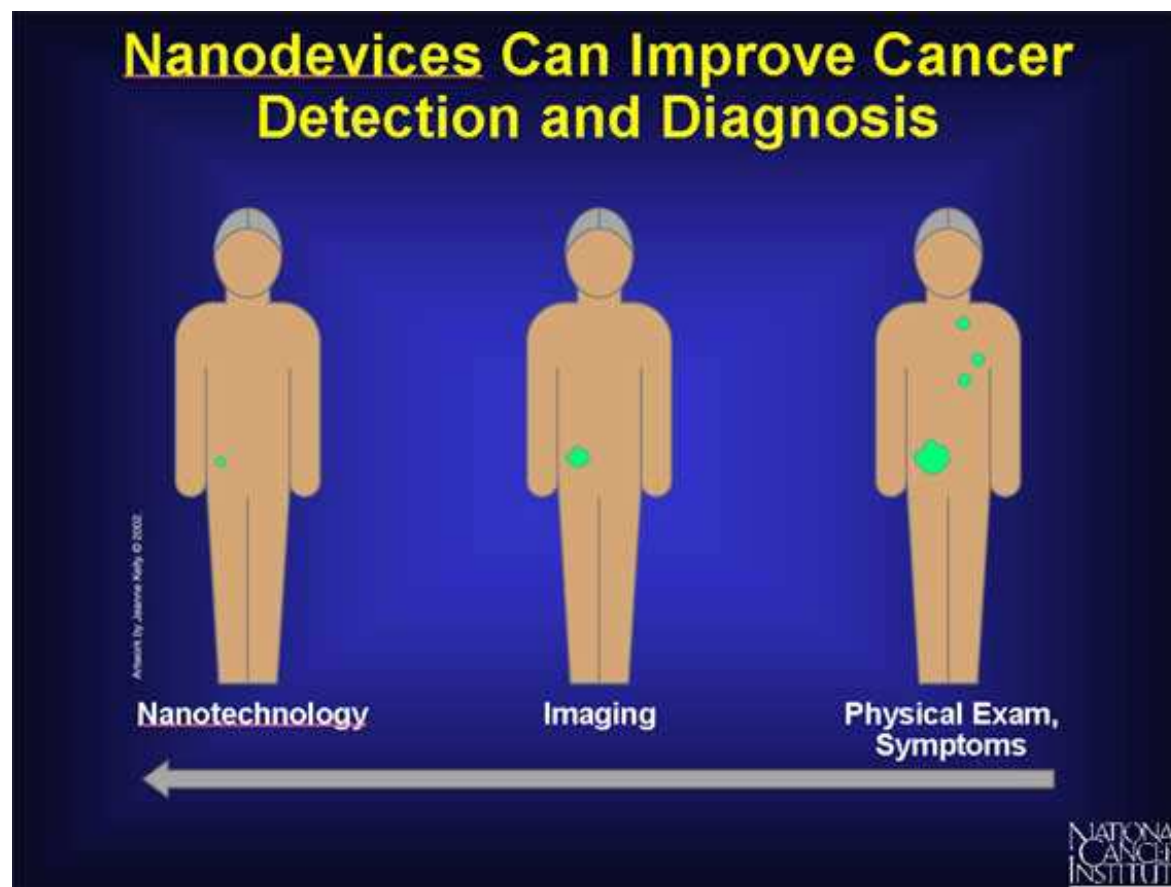
Biološka primjena

- Biooslikavanje i terapijsko djelovanje



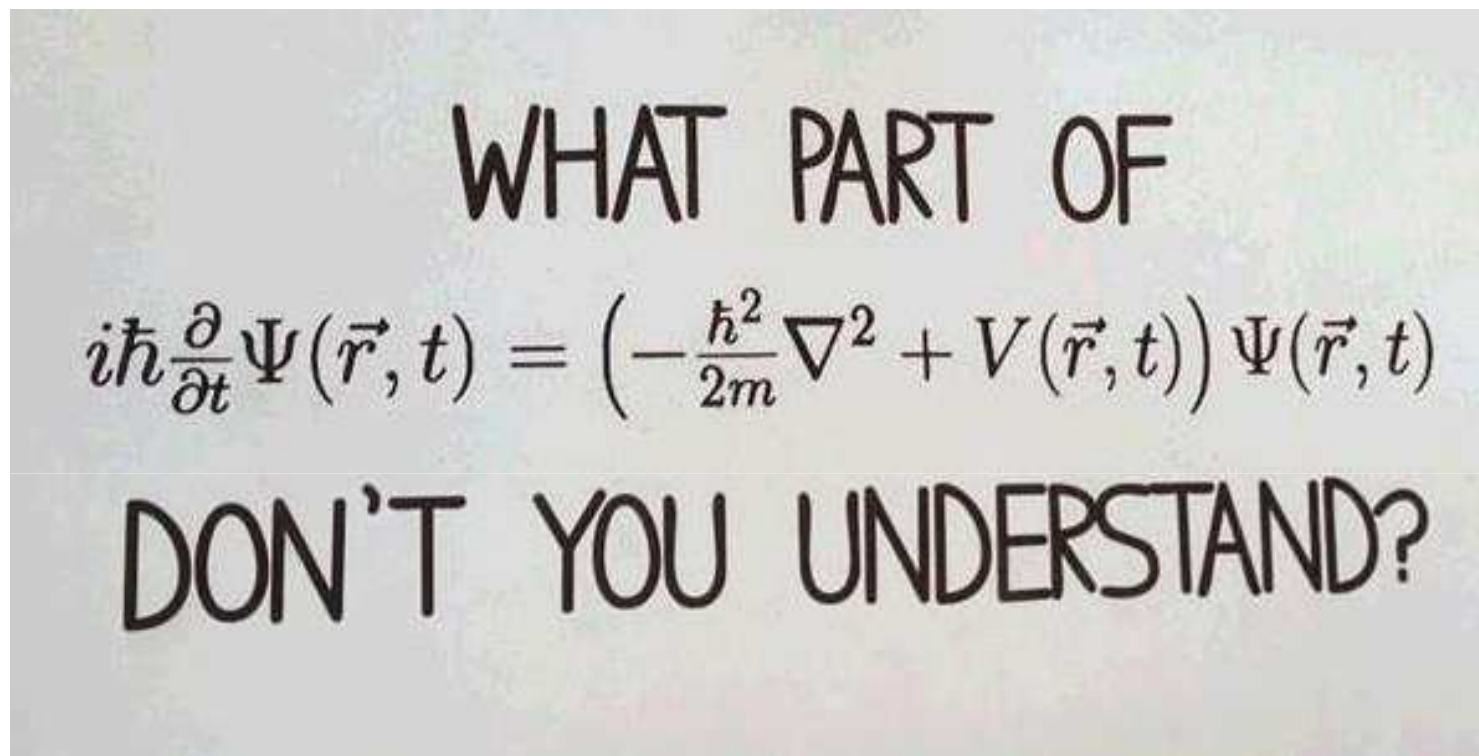


CILJ: karakterizacija i dizajn NCs za biosenzoriku s povećanom osjetljivošću





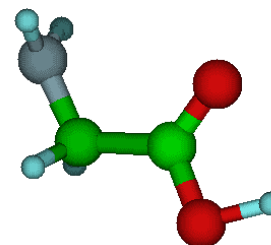
Teorijske metode



Računalne simulacije!

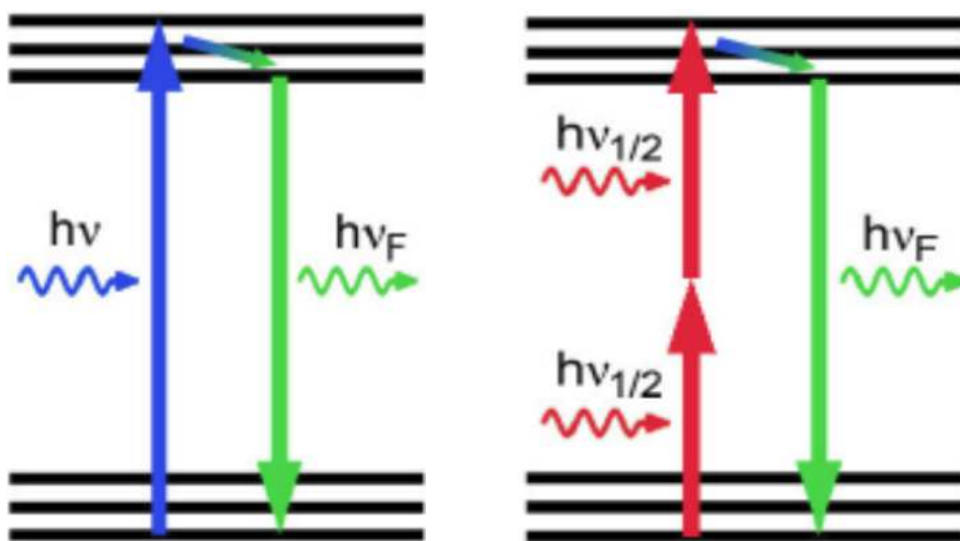


- Određivanje strukture



- Određivanje optičkih svojstava:

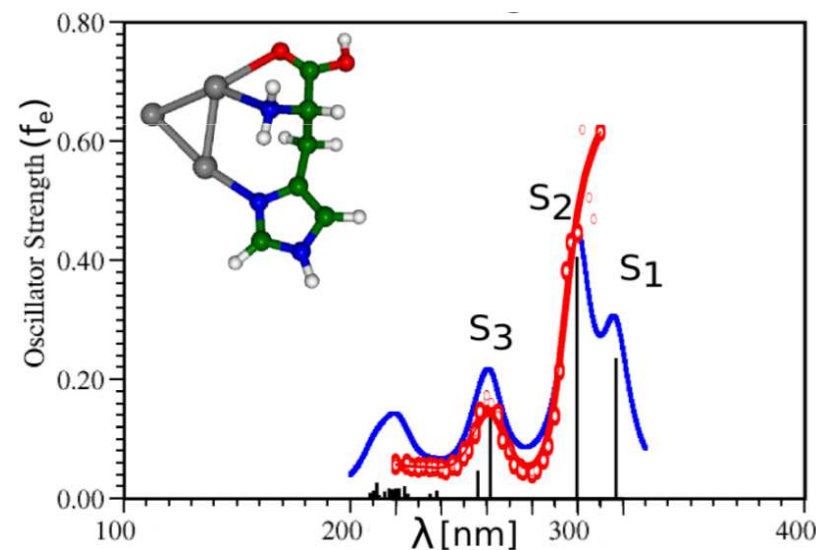
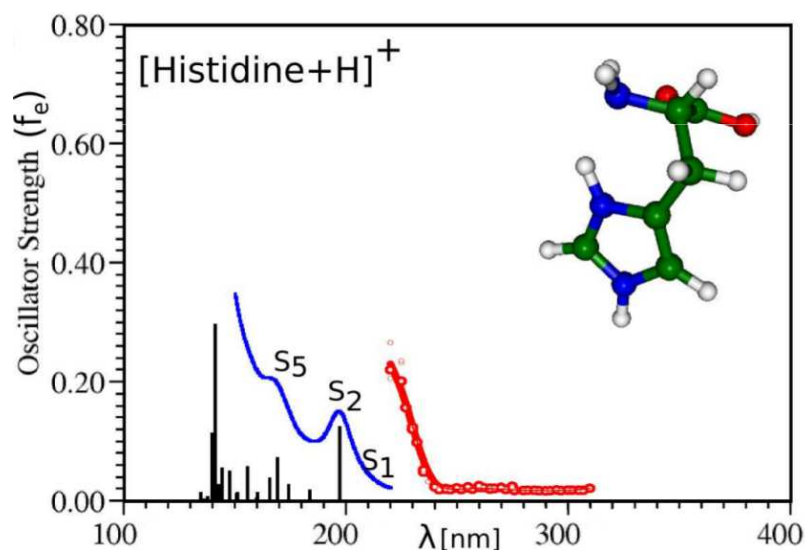
Linearnih & Nelinearnih





Rezultati: Linearna svojstva

- Potvrda koncepta-Ag klasteri utječu na apsorpcijski spektar biomolekula (npr. histidin)



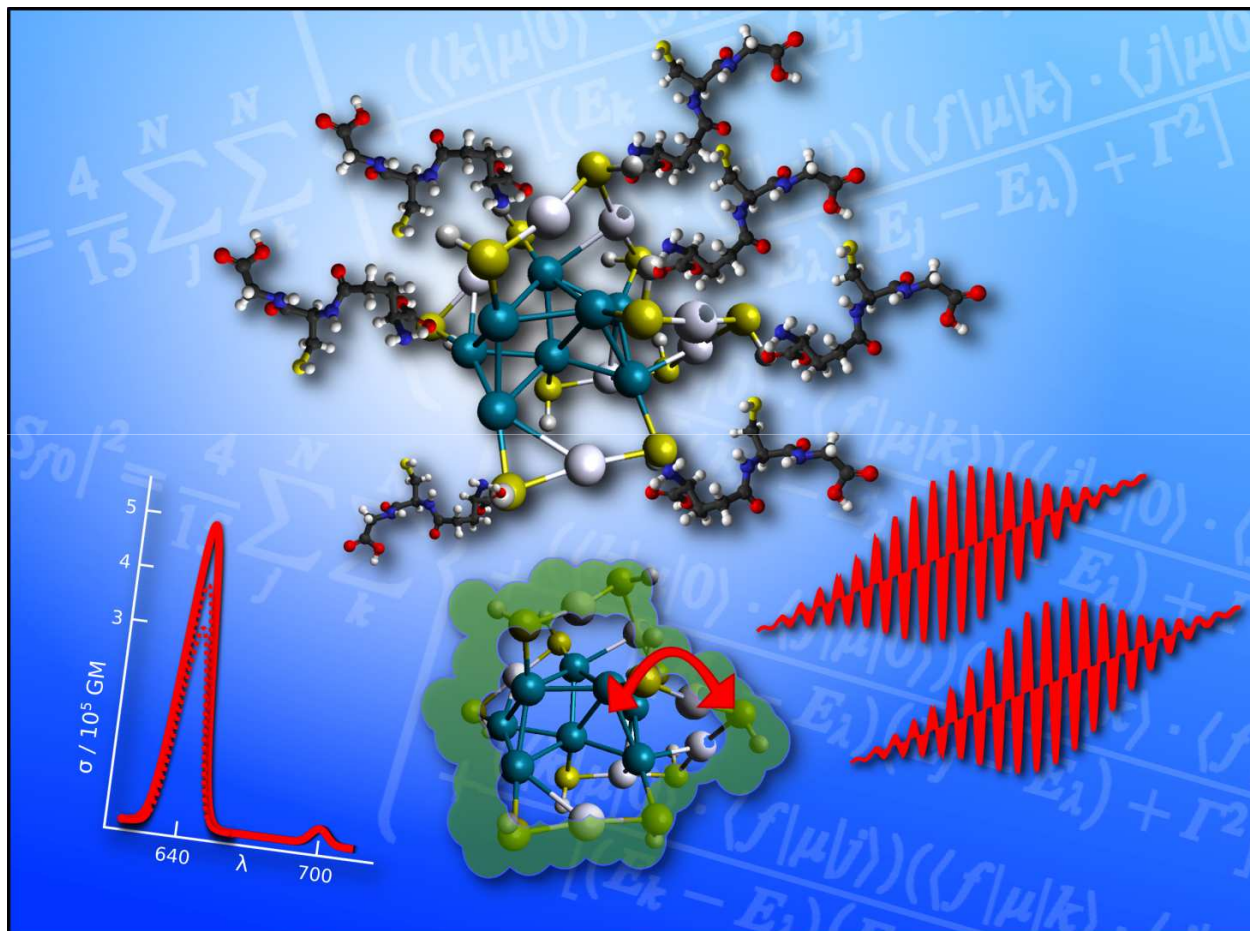
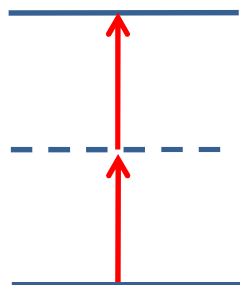
Sanader et al, *PCCP*, 2014, **16**; 1257



Rezultati: Nelinearna svojstva



Maria Goeppert-Mayer
1906-1972
Nobel Prize in Physics 1963

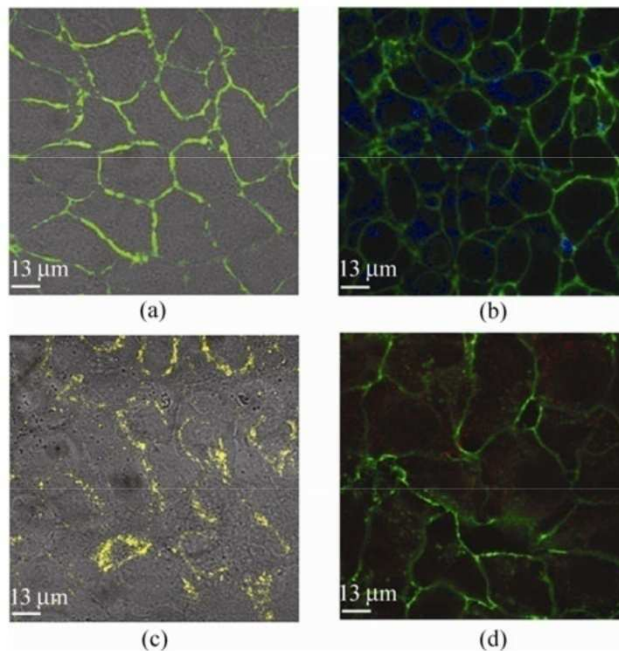


CILJ: Dizajnirati lignadirane srebrne klastere s velikim TPA

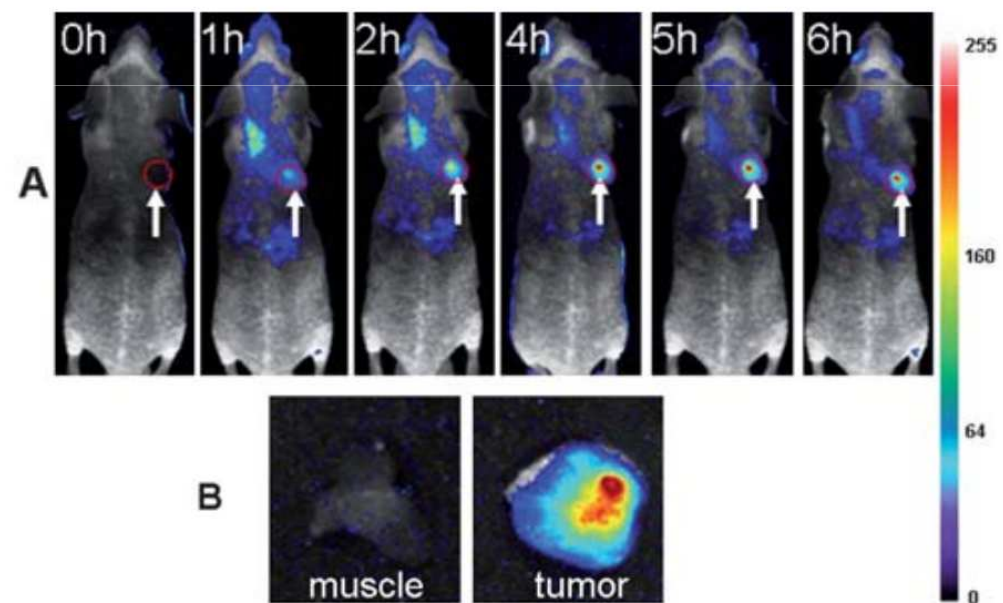


Primjene u biološkom oslikavanju

- AgNC (< 2nm)– 3 različite boje za oslikavanje
- AuNC (2.7 nm)-EPR efekt →oslikavanje tumora



Nano Res, 2012, 5, 379

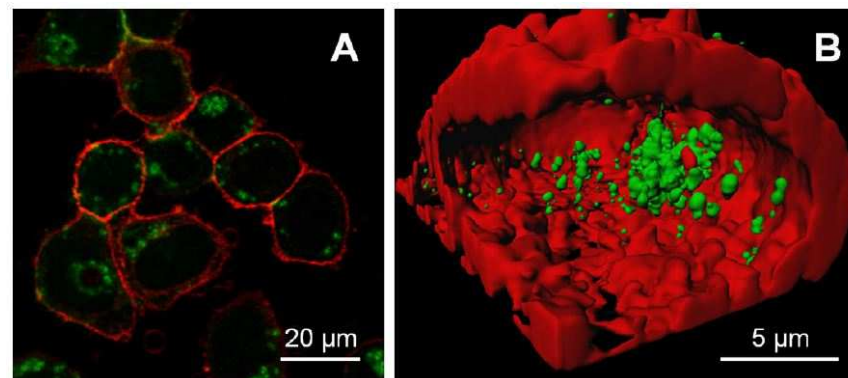
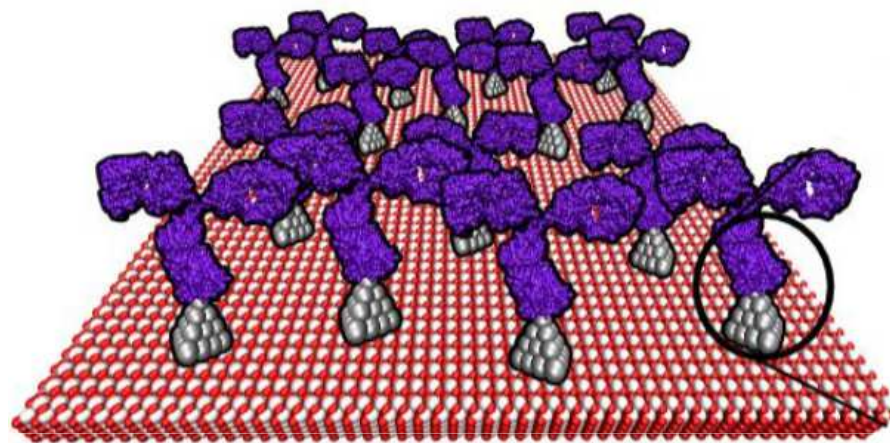


Nanoscale, 2010, 2, 2244



Buduće istraživanje

- Label-free protein biochip za biosenzoriku
- Nelinearna optika -> poboljšanje medicinske dijagnostike koristeći pojačanu senzitivnost nanoklastera



Nanoscale, 2011, 3, 2009



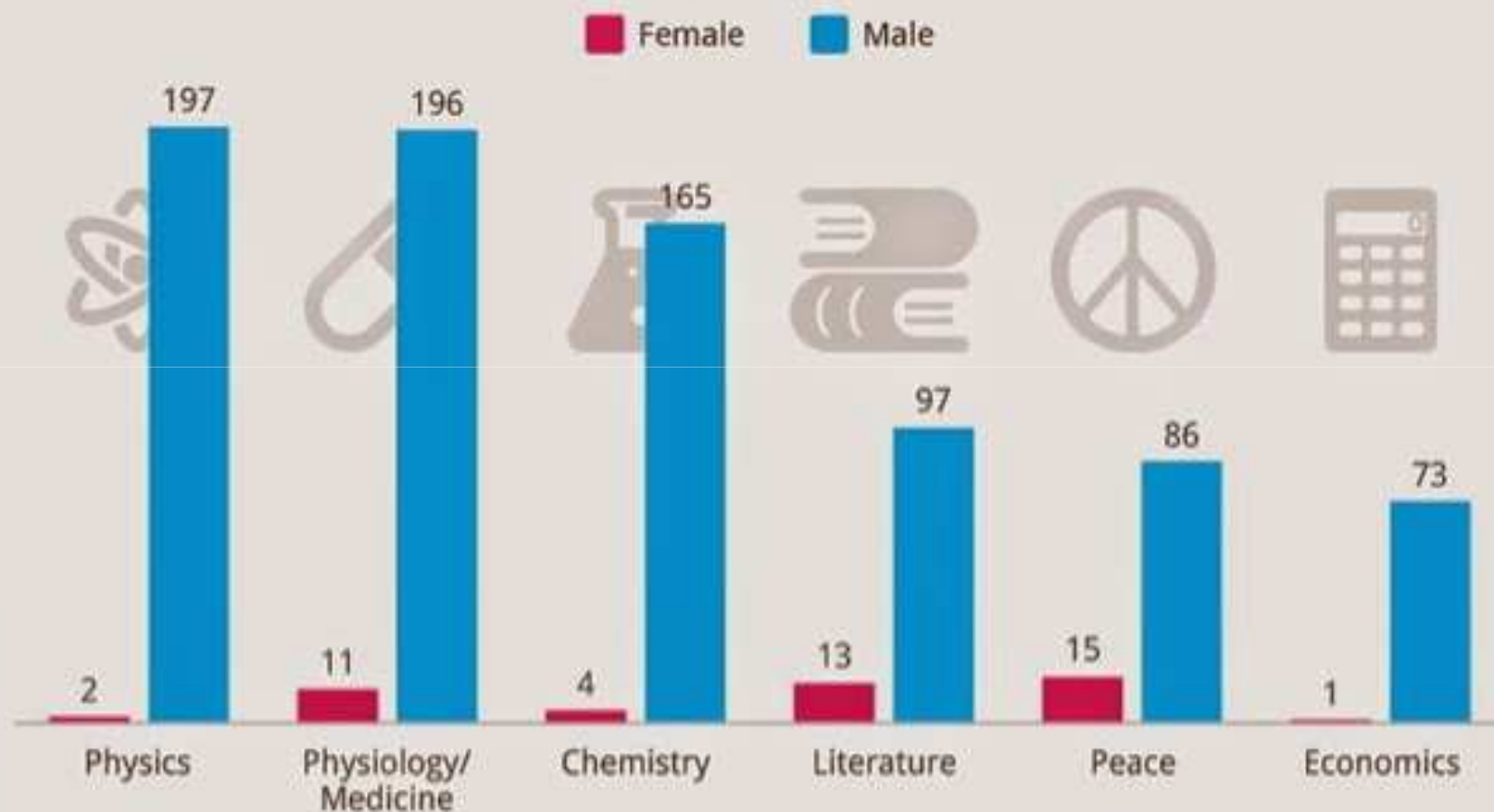
Zahvaljujem:

- Vlasta Bonačić-Koutecký
- Marjan Krstić
- Martina Perić
- Vedran Ivanić
- Rodolphe Antoine
- Philippe Dugourd
- Franck Bertorelle
- Ramzi Hamouda
- Driss Rayane



The Nobel Prize Gender Gap

Nobel Prize winners since 1901 by category and gender (as of Oct. 8, 2014)



Hvala na pažnji!