

Stellingen

behorende bij het proefschrift

GOLD NANOROD PHOTOLUMINESCENCE APPLICATIONS TO IMAGING AND TEMPERATURE SENSING

1. Heterogeneity among gold nanorods goes beyond what experimental accuracy can resolve. This is a major drawback that has to be addressed in the future.
Chapters 2 and 4 of this thesis
2. It is not an *a priori* requirement to fully understand a phenomenon in order to successfully exploit it.
Chapter 3 of this thesis
3. It is important to study nanoparticles with different geometries; however this type of work tends to be of a lower impact and less motivating than focusing into a new or not yet explained phenomenon.
Chapter 4 and 5 of this thesis
4. A complete model to explain the luminescence of single gold nanoparticles is missing; more accurate temperature measurements and planning future experiments will depend on having such a model.
Chapter 4 of this thesis
5. Measuring temperature with surface enhanced Raman spectroscopy (SERS), only allows to determine temperature in the hotspot.
Pozzi et al., J. Phys. Chem. C 119, 21116-21124 (2015).
6. The future of plasmonic enhanced fluorescence correlation spectroscopy (FCS) may lie in cleverly designed nanoparticles.
Langguth et al., Opt. Express 22, 15397 (2014).
7. Thermometry in living cells needs very careful data analysis and interpretation. Sloppy raw data processing may lead to artifacts and false conclusions.
Baffou et al., Nat. Methods 11, 899-901 (2014).
8. Superlocalization requires more than fitting bright pixels by a Gaussian. When dealing with new sources of light it is important to verify the hypothesis that lead to accuracies beyond the diffraction limit.
Titus et al., ACS Nano 7, 6258-6267 (2013).
9. Gender inequality has to be addressed in a definitive way. The scientific *system* is no example to follow by the rest of society.

10. Failed research is much riskier for a PhD candidate than for someone with a permanent position; risk management should always be a priority.
11. Researchers should always keep an eye on societal issues. Research and its applications should not be confined to academic environments.
12. Reverting the paper-frenzy of the last several years is a collective effort that has to be agreed by different actors, from researches to governing bodies, and specially by *us*.

Aquiles Carattino
Leiden, February 30, 2017