

Victor Gray, Ph.D. Student

✉ victor.gray@chalmers.se ☎ +46 73 702 50 30
🌐 <https://www.linkedin.com/in/victor-gray-07445944/>



About Me

- On the 29th of September, I will defend my Ph.D. Thesis which focuses on the synthesis and spectroscopic characterization of chromophores for triplet-triplet annihilation photon upconversion. Upon graduating I wish to broaden my knowledge further by doing a Post Doc., preferably working with optoelectronic materials, studying the energy and electron transport properties of semiconductor-organic hybrid materials.

Employment History

- 2013 – ···· ■ Ph.D. Student, Applied Chemistry, Chalmers University of Technology, Sweden.
- 2012 – 2013 ■ M.Sc. Thesis work, Applied Chemistry, Chalmers University of Technology, Sweden.
- 2011 – 2012 ■ Laboratory assistant Akzo Nobel, Stenungsund, Sweden. (Summer intern – 8 weeks/year.)

Education


- 2013 – present ■ Ph.D. Student Applied Chemistry, Chalmers University of Technology, Sweden
Research Project: *New Materials for Triplet-Triplet Annihilation Photon Upconversion*.
More details at <http://moth-poulsen.se>
- 2011 – 2013 ■ M.Sc. Nanotechnology, Chalmers University of Technology, Sweden. Chemical and Biological Engineering.
Thesis title: *New Materials for Solar Thermal Storage: Synthesis and Characterization of New Materials for Solar Thermal Energy Storage*.
- 2008 – 2011 ■ B.Sc. Chemical Engineering, Chalmers University of Technology, Sweden.

Skills





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| Languages | ■ Fluent in English and Swedish. |
| Laboratory | ■ Capable of designing and performing organic synthesis and chalcogenide nanocrystal synthesis. Experience from working under inert gas using Schlenk line and glove-box. |
| Spectroscopy | ■ Proficient in spectroscopic techniques such as steady state absorption and emission spectroscopy, time-resolved emission spectroscopy and time-correlated single photon counting (TCSPC) as well as nanosecond resolved transient absorption, using both commercial and in-house built instruments. |
| Teaching | ■ Supervision of one M.Sc. Thesis student, two international student projects and several B.Sc. students. Lab Teaching Assistant – Obtained excellent feedback from student evaluations. |
| Computer Competence | ■ Kinetic modelling and fitting using Matlab and Origin. Writing in L ^A T _E X and Office programmes. |
| Personal | ■ Ability to work independently but also in a team. Fast learner and eager to acquire new skills. |

Experience & Qualifications





Research Visit

- 2016  University of California Riverside. Three months visit to Prof. Ming Lee Tang's group at UCR, working with chalcogenide nanocrystal synthesis and characterization.










Stipends & Grants

-  Sixten Gemzéus Stiftelse. Travel grant for research visit to UCR.
- 2015  Nils Pihlblads Stipendiefond. Travel grant for Gordon Research Conference.
- 2014  Chalmerska Forskningsfonden. Travel grant for ElecMol 2014.
-  Åforsk. Travel grant for Gordon Research Conference.

Conferences





- 2016  1st International Symposium on Singlet Fission and Photon Fusion. Contributed Talk, Chalmers University of Technology, Sweden.
- 2015  Gordon Research Conference & Seminar – Photochemistry, Poster Presentation, Easton, USA.
- 2014  ElecMol, Poster Presentation, Strasbourg, France.
-  Gordon Research Conference & Seminar – Electronic Processes in Organic Materials, Poster Presentation, Lucca Barga, Italy.

Selected Ph.D. and M.Sc. Courses

- Ph.D.  Principles of Fluorescence Spectroscopy
-  Physical Organic Chemistry
-  Organic Synthesis
-  Molecular Electronics & Molecular Switches
-  Applied Project Management
-  Teaching, Learning and Evaluation
- M.Sc.  Applied Spectroscopy
-  Applied organic molecular Spectroscopy
-  Nanoscience

Research Publications

Journal Articles

-  Gray, V., Dreos, A., Erhart, P., Albinsson, B., Moth-Poulsen, K., & Abrahamsson, M. (2017). Loss channels in Triplet-Triplet Annihilation Photon Upconversion: Importance of Annihilator Singlet and Triplet Surface Shapes. *Phys. Chem. Chem. Phys.* (in press).
-  Gray, V., Xia, P., Huang, Z., Moses, E., Fast, A., Fishman, D. A., ... Tang, M. L. (2017). CdS/ZnS core-shell nanocrystal photosensitizers for visible to UV upconversion. *Submitted*.
-  Börjesson, K., Rudquist, P., Gray, V., & Moth-Poulsen, K. (2016). Photon upconversion with directed emission. *Nat. Commun.* 7, 12689. doi:10.1038/ncomms12689
-  Dzebo, D., Börjesson, K., Gray, V., Moth-poulsen, K., & Albinsson, B. (2016). Intramolecular Triplet-Triplet Annihilation Upconversion in 9,10-Diphenylanthracene Oligomers and Dendrimers. *J. Phys. Chem. C*, 120(41), 23397–23406. doi:10.1021/acs.jpcc.6b07920

- 5 Gray, V., Börjesson, K., Dzebo, D., Abrahamsson, M., Albinsson, B., & Moth-Poulsen, K. (2016). Porphyrin–Anthracene Complexes: Potential in Triplet–Triplet Annihilation Upconversion. *J. Phys. Chem. C*, 120(34), 19018–19026. doi:10.1021/acs.jpcc.6b06298
- 6 Lennartson, A., Lundin, A., Börjesson, K., Gray, V., & Moth-poulsen, K. (2016). Tuning the photochemical properties of the fulvalene-tetracarbonyl-diruthenium system. *Dalt. Trans.* 45, 8740–8744. doi:10.1039/c6dt01343k
- 7 Gray, V., Dzebo, D., Lundin, A., Alborzpour, J., Abrahamsson, M., Albinsson, B., & Moth-Poulsen, K. (2015). Photophysical characterization of the 9,10-disubstituted anthracene chromophore and its applications in triplet–triplet annihilation photon upconversion. *J. Mater. Chem. C*, 3, 11111–11121. doi:10.1039/C5TC02626A
- 8 Börjesson, K., Čoso, D., Gray, V., Grossman, J. C., Guan, J., Harris, C. B., ... Weidman, T. W. (2014). Exploring the Potential of Fulvalene Dimetals as Platforms for Molecular Solar Thermal Energy Storage: Computations, Syntheses, Structures, Kinetics, and Catalysis. *Chem. - A Eur. J.* 20(47), 15587–15604. doi:10.1002/chem.201404170
- 9 Gray, V., Dzebo, D., Abrahamsson, M., Albinsson, B., & Moth-Poulsen, K. (2014). Triplet-triplet annihilation photon-upconversion: towards solar energy applications. *Phys. Chem. Chem. Phys.* 16(22), 10345–10352. doi:10.1039/c4cp00744a
- 10 Gray, V., Lennartson, A., Ratanalert, P., Börjesson, K., & Moth-Poulsen, K. (2014). Diaryl-substituted norbornadienes with red-shifted absorption for molecular solar thermal energy storage. *Chem. Commun.* 50, 5330. doi:10.1039/c3cc47517d

Popular Science Publications

Popular Science Articles

- 1 Lennartson, A., Gray, V., & Moth-Poulsen, K. (2015a). Molekyl lagring af solenergi eller kunsten at lagre lidt forårs-sol til vinteren. *Dansk Kemi*, 8, 22-25, TechMedia.
- 2 Lennartson, A., Gray, V., & Moth-Poulsen, K. (2015b). Molekylär lagring av solenergi eller konsten att spara lite vårsol till vintern. *Kemivärlden*, 3, 18-21, Svenska Kemisamfunder.

References

Prof. Kasper Moth-Poulsen
Chalmers University of Technology,
Gothenburg, Sweden.

✉ kasper.moth-poulsen@chalmers.se
☎ +46 761 99 68 55

Prof. Maria Abrahamsson
Chalmers University of Technology,
Gothenburg, Sweden.

✉ abmaria@chalmers.se
☎ +46 702 14 92 47

Prof. Bo Albinsson
Chalmers University of Technology,
Gothenburg, Sweden.

✉ balb@chalmers.se
☎ +46(0)31 772 30 44