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## Summary

My primary research interest is in the physics of holographic optical tweezers and their applications in nanoscience. This work forms part of the Dynamic Holographic Assembler project.

I am also interested in molecular nanophysics. In collaboration with other members of the Nanophysics and Soft Matter group, I study image formation in the atomic force microscope (AFM) and single molecule force-spectroscopy.

I also study self-assembling molecular nanostructures through molecular modeling techniques including Monte Carlo and molecular dynamics simulations.

I have co-authored a book on Liquid Crystalline Polymers

## Biography

Outside the department, I am Vice-Chairman of the Polymer Physics Group of the Institute of Physics, and a member of the Applied Physics and Technology Division committee.

## Keywords

- nanoscience
- molecular nanophysics
- Polymers

## Memberships

### Organisations

[Interface Analysis Centre](#)

[School of Physics](#)

### Physics staff

- [Physics academic staff](#)

### Research areas

- [Light and Matter: Physics at the Interface](#)

## Research groups

- [Nanophotonics and Nanophysics](#)
- [Biological, Soft and Complex Matter](#)

## Research interests

- [Optical Micromanipulation](#)
- [Materials Simulations](#)

## Recent publications

- O'Donnell, M & Hanna, S, 2019, '[Optical forces on patterned particles](#)'. in: Enrique J Galvez, David L Andrews, Jesper Gluckstad (eds) *Complex Light and Optical Forces XIII*. Society of Photo-Optical Instrumentation Engineers (SPIE)
- Simpson, S, Zemánek, P, Maragò, OM, Jones, P & Hanna, S, 2017, '[Optical binding of nanowires](#)'. *Nano Letters*, vol 17., pp. 3485-3492
- Irrera, A, Magazzù, A, Artoni, P, Simpson, SH, Hanna, S, Jones, PH, Priolo, F, Gucciardi, PG & Maragò, OM, 2016, '[Photonic Torque Microscopy of the Nonconservative Force Field for Optically Trapped Silicon Nanowires](#)'. *Nano Letters*, vol 16., pp. 4181-4188
- Simpson, SH & Hanna, S, 2016, '[Optical binding between nanowires](#)'. in: *Complex light and optical forces X*. Society of Photo-Optical Instrumentation Engineers (SPIE)
- Simpson, SH & Hanna, S, 2016, '[Optical binding between knotted and chiral nanoparticles](#)'. in: *Optical Trapping and Optical Micromanipulation XIII: San Diego, California, United States | August 28, 2016*. Society of Photo-Optical Instrumentation Engineers (SPIE)
- Simpson, SH, Phillips, DB, Brzobohatý, O, Antognozzi, M, Hanna, S & Zemánek, P, 2015, '[Shape adapted optical forces and interactions](#)'. in: *Optical Trapping Applications, OTA 2015*. Optical Society of America (OSA)
- De Coster, D, Ottevaere, H, Vervaeke, M, Van Erps, J, Callewaert, M, Wuytens, P, Simpson, SH, Hanna, S, De Malsche, W & Thienpont, H, 2015, '[Mass-manufacturable polymer microfluidic device for dual fiber optical trapping](#)'. *Optics Express*, vol 23., pp. 30991-31009
- Debono, LJ, Box, S, Phillips, DB, Simpson, SH & Hanna, S, 2015, '[Hydrodynamic synchronisation of optically driven rotors](#)'. in: *Optical Trapping and Optical Micromanipulation XII*. Society of Photo-Optical Instrumentation Engineers (SPIE)
- Simpson, SH, Jones, PH, Maragó, OM & Hanna, S, 2015, '[Optical binding and synchronisation in arrays of non-spherical particles](#)'. in: *Optical Trapping Applications, OTA 2015*. Optical Society of America (OSA)
- Phillips, DB, Padgett, MJ, Hanna, S, Ho, Y-L, Carberry, DM, Miles, MJ & Simpson, SH, 2014, '[Shape-induced force fields in optical trapping](#)'. *Nature Photonics*, vol 8., pp. 400-405

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