

# New Functional Luminescent Materials Studied Molecule by Molecule.

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## Background

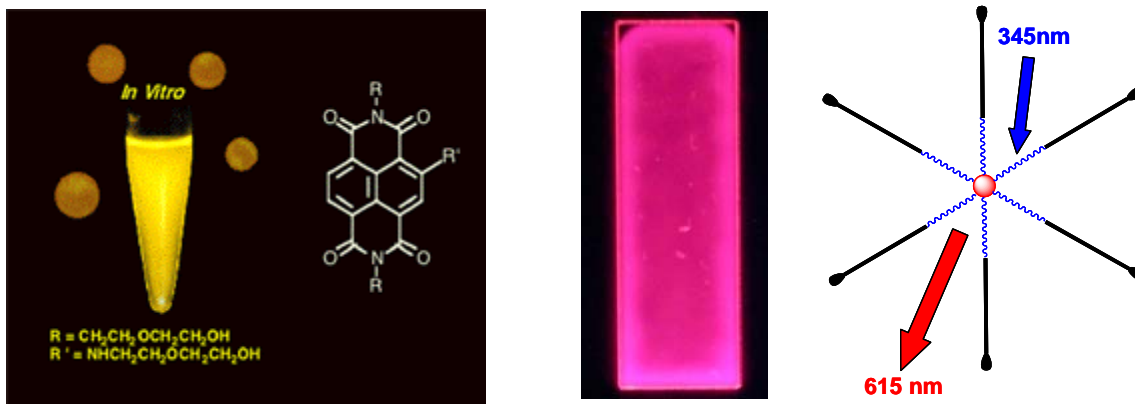
We are using state-of-the-art single molecule detection techniques to study new functional luminescent materials that have potential applications as molecular probes in bio-imaging and solar light harvesting. Single molecule techniques can yield information about the distribution of a given parameter rather than just the ensemble averaged value and reveal rare phenomena that would otherwise be obscured in a bulk measurement.

## Outcomes:

- New class of ultra-stable high quantum yield fluorescent dye molecules suitable for use as fluorescent labels of biological samples developed in collaboration with Prof. Steven Langford, Monash University.
- New photo-active polymers for use in light harvesting and artificial photosynthetic applications.

## Progress to date.

- Novel dye compounds based on a naphthalene diimide (NDI) have been synthesized and shown to be highly fluorescent and photo-stable.
- A range of photo-active polymers has been synthesized with well controlled polymer chain length and architecture.



Left – Fluorescence from a new NDI based dye molecule and its chemical structure.  
Right – Luminescence from a film of a light harvesting polymer with the star-shaped architecture shown.

## Funding is sought to

- Develop the NDI based dye molecules into commercial fluorescent probes.
- Build working photo-voltaic devices based on the photo-active polymers.

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