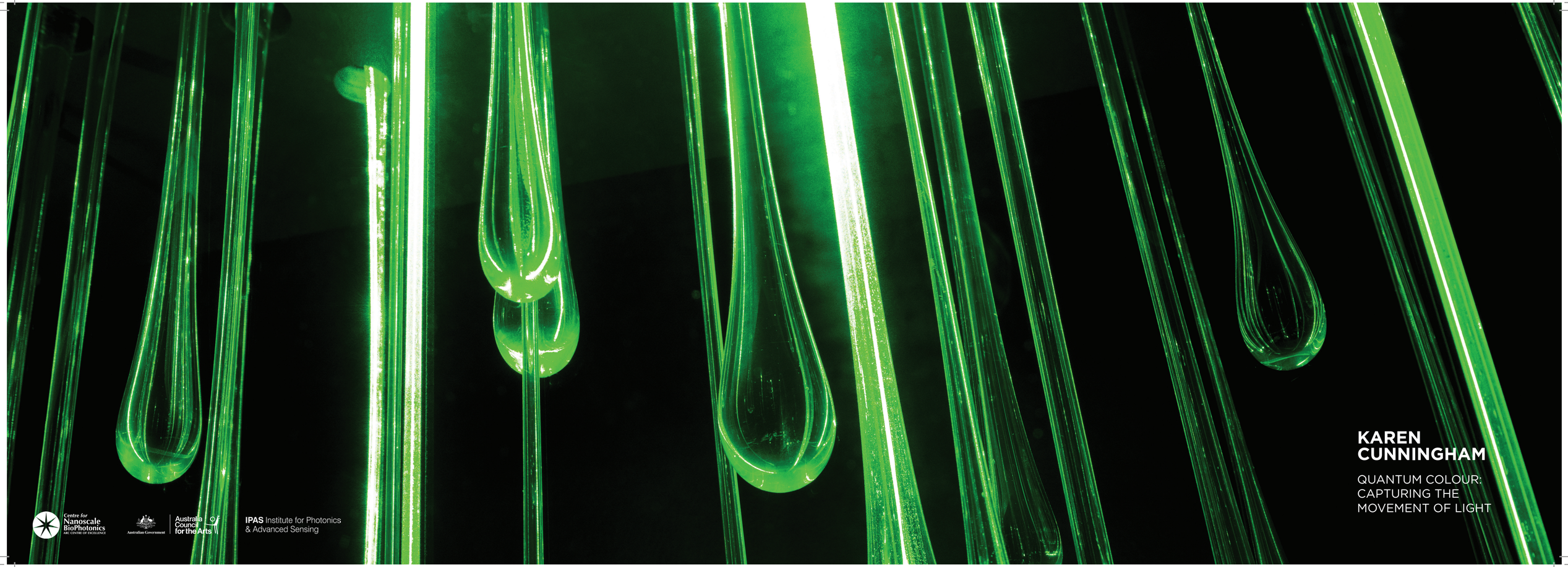

KAREN CUNNINGHAM

QUANTUM COLOUR:
CAPTURING THE
MOVEMENT OF LIGHT

Centre for Nanoscale BioPhotonics
ARC CENTRE OF EXCELLENCE

Australian Government | Australia Council for the Arts

IPAS Institute for Photonics & Advanced Sensing

QUANTUM COLOUR:
CAPTURING THE MOVEMENT OF LIGHT

Karen Cunningham presents a new propositional work that follows her inquiry into the potentials of integrating fluorescing diamond particles into glass. Her cutting-edge innovations reveal startling luminescent effects, the likes of which have never before been trialled in an artistic context. Karen continues to pursue her enduring fascination with the nature of light, while exploring the dialogue between the physical and chemical properties of this new material in her studio-based glass practice.

Central to Karen's investigation is her personal reflection on "art informing science, science informing art." Weaving these worlds to find symmetries and synergy is a consistent theme throughout her work. In an interdisciplinary and dynamic collaboration with the Centre for Nanoscale Biophotonics (CNBP) and the University of Adelaide's Institute for Photonics and Advanced Sensing (IPAS), Karen fuses ground-breaking scientific research in the fields of photonics and nanotechnology to create experimental designs in glass.

Karen is the Creative Director of JamFactory's Glass Studio.

karen-cunningham.com

Research into the light transmitting properties of nanoparticles owes inspiration to an extraordinary 4th century Roman artefact known as the Lycurgus Cup, held by the British Museum. This ornate glass vessel displays curious optical characteristics when illuminated from different angles - inexplicably changing from a deep translucent red to an opaque olive green. A mystery for centuries, the cause of this colour change was finally revealed as advances in technology allowed scientists to detect tiny gold and silver particles ubiquitously embedded throughout the glass. Now known as nanoparticles, the light shifting qualities of these microscopic minerals are proving significant for the advancement of electronics, optics, and medical sensing.

Karen's initial trials with diamond nanoparticles showed surprising results. Incorporated into molten glass, different size particles were found to exhibit different behaviours, and capturing their luminescence was achieved only under precise directional and spectral parameters. The particles themselves are unusual in that their crystal structure has been altered in a lab and infused with nitrogen. This addition of nitrogen grants the diamonds special fluorescent properties which are activated under a particular wavelength of green laser light - however the laser itself is too dominant for the actual fluorescence to be seen. A specialty laser filter screen is used to completely block out the green light, leaving behind only the true red glow of the fluorescing diamonds.

Capturing these unique illumination characteristics is the beginning of Karen's deeper inquiry into the unexplored reactions and interplay between nanoscale materials and the natural refractive, reflective qualities of glass.