with a second fluorophore (such as Cy2 or Cy3), its activation wavelength is strongly influenced by the spectral characteristics of its neighbor (11). We took advantage of this property to selectively activate specific populations of dye pairs, enabling us to capture images of multiple molecular targets within the same sample. Using antibodies labeled with either Cy3 and Cy5, or Cy2 and Cy5, we imaged microtubules and clathrin-coated pits in cultured mammalian cells (see the figure, parts E to G). In comparison with the conventional fluorescence image, the STORM image reveals previously unseen detail due to its high spatial resolution (~25 nm) and clearly resolves the rounded structure of clathrin pits only 150 to 200 nm in diameter (11).

Many cellular structures have a complex three-dimensional (3D) shape, requiring a 3D imaging method for study. Taking advantage of a technique for 3D particle localization, we used astigmatic imaging to generate 3D STORM images with 25-nm lateral resolution and 50-nm axial resolution. With this strategy, we were able to obtain images of the full spherical structure of clathrin-coated pits (12).

Although imaging techniques based on this concept are relatively recent, they have already been used to understand mechanisms in biology. Greenfield et al. (13) have used these techniques to develop a model of how chemotaxis receptors in Escherichia coli organize in growing cells. Biteen et al. (14) have visualized the nanoscale structure of MreB in live Caulobacter crescentus, taking advantage of the photoswitchable fluorescence of enhanced yellow fluorescent protein (EYFP). Also, Hess et al. (15) have obtained high-resolution images and dynamic information from influenza hemagglutinin, a clustered membrane protein, to differentiate between membrane organization models in fibroblast cells.

The development of sub–diffraction limit fluorescence microscopy has created new possibilities for the observation of biological processes, and a new assay for the organization and composition of biomolecular complexes. With continued advances in fluorescent labels and labeling methods (16), it will be exciting to see how these techniques are applied to bring about insights into life at the nanometer scale.

**2010 Grand Prize Winner**

**Mark Bates** was born in Toronto, Canada. He received a B.Sc. degree in engineering physics from Queen’s University and an M.Sc. degree in physics from McGill University. He conducted his doctoral research at Harvard University, working under the guidance of Xiaowei Zhuang, where he studied the properties of photoswitchable fluorescent molecules and applied these results to develop a new method for high-resolution optical imaging. Dr. Bates is now a postdoctoral fellow in the laboratory of Stefan Hell in Göttingen, Germany, where he is applying super-resolution fluorescence microscopy to study prokaryotic cell biology.

**Regional Winners**

**Europe:** Ataman Sendoel for his essay “Is Death Without Oxygen as Sweet as Apoptosis?” Dr. Sendoel was born in Zurich, Switzerland. He studied medicine at the Universities of Zurich and Lausanne. After finishing medical school, he joined the M.D.-Ph.D. program of the University of Zurich. He conducted his Ph.D. work in the laboratory of Michael Hengartner, where he studied mechanisms of controlling programmed cell death in Caenorhabditis elegans. Dr. Sendoel is currently a postdoctoral fellow and continues to work on hypoxia responses in C. elegans.

**Japan:** Sakiko Honjoh for her essay “Is Aging Necessary?” Dr. Honjoh was born in Yokohama, Japan. Inspired by a high-school biology teacher, she decided to major in molecular biology and entered Kyoto University. Continuing on this track, Dr. Honjoh completed her Ph.D. in the laboratory of Eisuke Nishida at the Graduate School of Biostudies, Kyoto University, working on the signal transduction networks that regulate life span. She is continuing her work in the same lab, still trying to elucidate the molecular changes that occur during aging.

**All Other Countries:** Melissa Fullwood for her essay “Genome-Wide Chromatin Loops Regulate Transcription.” Dr. Fullwood, born and raised in Singapore, graduated from Stanford University in 2005 and completed her Ph.D. in 2009 at the Genome Institute of Singapore under the auspices of the National University of Singapore where she was supervised by Yijun Ruan. In 2009, she was selected for the inaugural L’Oreal for Women in Science National Fellowships in Singapore. She is currently a Lee Kuan Yew Post-Doctoral Fellow at the Duke-NUS Graduate Medical School Singapore under the supervision of Shirish Shenolikar.

For the full text of essays by the regional winners and for information about applying for next year’s awards, see *Science* Online at www.sciencemag.org/feature/data/prizes/ge/index.dtl.

**References and Notes**

17. Figure panels A to D are adapted from Current Opinion in Chemical Biology, vol. 12, “Super-resolution microscopy by nanoscale localization of photo-switchable fluorescent probes,” M. Bates, B. Huang, and X. Zhuang, pages 505–514, Copyright 2008, with permission from Elsevier.