

## Nanotechnology ROI at e2v Technologies - an Interview with Dr Richard Gilbert, Principal Scientist (Biosensors)

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e2v Technologies (e2vtechnologies.com), founded 60 years ago, is a company that has consistently shown an ability to innovate and bring high technology products to market. They are a leading supplier of radio frequency, microwave, and sensing components and sub-systems to a wide range of applications.

Materials science is at the root of what e2v does - their scientists, engineers, and technicians are highly respected in their fields, and have continually demonstrated their skills in developing solutions to meet the most challenging environments and applications. The company has sales offices in the UK, USA, France, and Germany, alongside an established global distribution network.

Accelrys caught up with Dr Richard Gilbert, principal scientist in the biosensors group, e2v Technologies, to discuss the use of modeling and simulation at e2v.

"We use Accelrys' MS Modeling 3.0 (CASTEP, DMol<sup>3</sup>, Discover, and Amorphous Cell), and ANSYS Multiphysics 7.1 (with MEMS extensions)," said Dr Gilbert. "The Accelrys tools are used for materials modeling for lab-on-a-chip and nanotechnology-based biosensors. The ANSYS tools are used for CFD, structural modeling, and EM field modeling for our lab-on-a-chip designs."

The scientific research conducted using these tools at e2v has resulted in a plethora of work published in the peer-reviewed press. "We have published over 25 scientific papers since 1994, in journals including Nature, Science, and Analytical Chemistry," said Dr Gilbert.

"Computational methods provide a tool to rationally focus and prioritize the experimental work to enhance the productivity and efficiency of gaining useful results," explained Dr Gilbert. "The tools have helped solve my research problems - I have developed my own evolutionary computing and neural network algorithms for protein fold prediction, ligand docking, and multivariate data analysis."

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**Accelrys Corporate Headquarters**  
9685 Scranton Road  
San Diego, CA 92121-3752, USA  
Tel: +1 858 799 5000

**Accelrys European Headquarters**  
334 Cambridge Science Park  
Cambridge, CB4 0WN, UK  
Tel: +44 1223 228500

**Accelrys Asia Headquarters**  
Nishi-shimbashi TS Bldg 11F  
Nishi-shimbashi 3-3-1, Minato-ku,  
Tokyo, 105-0003, Japan  
Tel: 81 3 3578 3861



The use of this technology has helped Dr Gilbert refine existing processes, leading to cost savings. "During my previous employment, my protein modeling work enabled the rational design of several new biological entities, saving over two years of practical exploration. Materials modeling at ezv has probably saved an equivalent amount of time," commented Dr Gilbert.

"The use of MS Modeling solved a problem that had been present for about one year. We did not gain an advantage, but it prevented us from losing one."

And the cost savings? "Materials modeling, when used to solve a problem with an existing product, saved over £500k in development costs. This work found a solution in less than two weeks, so the cost of the software was re-couped in about one week."

Looking to the future, ezv will use the technology to further optimize their lab-on-a-chip biosensor devices, and extend the use of materials modeling to other aspects of their business. "We would like enhanced tools for UV/Visible, infrared, and Raman spectroscopy. Raman spectral predictions would be particularly valuable. Enhanced tools for free energy perturbation and redox point calculations," concluded Dr Gilbert.