

## Club of Amsterdam

### NanoWater

September, 2004



The aim of the **NanoWater** conference is to examine how nanotechnology can help address the issues facing the world's water supplies. According to Unesco, although 70 percent of the world's surface is covered by water, only a fraction of that - 2.5 percent - is freshwater, of which 70 per cent is frozen in ice caps. The remainder is present as soil moisture. This leaves less than one per cent of the world's freshwater resources accessible for human use.

Nanotechnology, while providing only a few radical new technologies for desalination, purification or waste water recovery, does have the ability to tilt the economic balance of many existing water related technologies in favour of large scale use. **NanoWater** will provide insight on those nanotechnologies and how they can be leveraged into the Water Industry to make them not only economically feasible but desirable.

#### September 27th

- 08:30-09:30 Registration
- 09:30 Opening and welcome

#### **SESSION 1: The Big Picture: Where Nanotechnology Gets Wet**

- 09:40 *Nanotechnology & Water: Revolutionary and Evolutionary Developments*  
SPEAKER: ► [Kevin M. McGovern](#), Chairman and CEO of [McGovern Capital LLC](#)
- 10:10 *An Overview of the State of the Art in Nanotechnology and where it Provides Greater Efficiencies and Cost Reductions for the Water Industry*  
SPEAKER: ► [Tim Harper](#), CEO, [Cientifica](#), Executive Director, [European NanoBusiness Association](#)
- 10:40 *Examining the Applications of Nanotechnology within the Water Industry*  
SPEAKER: ► [Uri Sagman](#), Executive Director, [Canadian NanoBusiness Alliance](#), Founder & Director, [C Sixty Inc.](#)
- 11:10 Coffee Break

#### **SESSION 2: Clean Water**

- 11:30 *Detection and Monitoring*  
SPEAKER: ► [Dr. Bob Carr](#), Chief Technology Officer, [NanoSight](#)
- 12:00 *Contaminant Removal*  
SPEAKER: ► [David E. Reisner](#), President & CEO, [The Nano Group, Inc.](#), President & CEO, [Inframat Corp.](#), President & CEO, [US Nanocorp, Inc.](#)

12:30 *Filtration*  
SPEAKER: ► [Fred Tepper, President, Argonide](#)

### SESSION 3: Affordability

13:00 *How Nanotechnology Can Introduce Economic Benefits and New Efficiencies: Will these be Incremental or Disruptive?*

SPEAKER: ► [Dr. Ir. Jeroen Boom, Project Design and Build Manager for Membrane Filtration, Rossmark Waterbehandeling B.V.](#)

13:30 *GWRI's Activities in Applying Nanotechnology to Water Processes*

SPEAKER: ► [Professor Raphael Semiat, Director, The Stephen and Nancy Grand Water Research Institute, Head, GWRI Rabin Desalination Laboratory, The Chemical Engineering Department, Technion - Israel Institute of Technology](#)

13:30 Lunch Break

15:00 OPEN PRESENTATIONS (15-20 minute presentations):  
*Nano and Micro Engineered Water Filtration Membranes*

SPEAKER: ► [Dr. Cees J.M. van Rijn, General Manager, Aquamarijn Research BV](#)

### SESSION 4: New Sources

16:30 *Nanotechnology & Desalination*

SPEAKER: ► [Dr. Eric Mayes, CEO, NanoMagnetics Ltd.](#)

17:00 *Nanotechnology & Groundwater*

SPEAKER: ► [Dr. Philippe Rychen, Head of Environmental Systems, Centre Suisse d'Electronique et de Microtechnique \(CSEM SA\)](#)

17:30 *Nanotechnology & Energy=Sustainable Water*

SPEAKER: ► [Diederik Jaspers, Senior Consultant, Altran Technologies Netherlands BV](#)

18:00 Conclusions and Open Discussion.

18:30 Close of conference

### Speakers' Bios



#### **Dr. Ir. Jeroen Boom**

Project Design and Build Manager for Membrane Filtration, Rossmark Waterbehandeling B.V.  
The Netherlands

#### *Working Experience*

January 1989 till May 1989

Trainee period at Heineken Nederlands Beheer B.V., Zoeterwoude, The Netherlands

Study of technical and economical feasibility of clarification of beer by means of microfiltration.

August 1989 till September 1990

Master thesis conducted at the Research Group Membrane Technology, Faculty of Chemical Engineering; University of Twente.

Study into the relation between molecular structure and gas separation properties of poly-oxadiazole and polytriazole membranes

December 1989 till March 1990

Research fellow at X-flow B.V., Enschede, The Netherlands.

Synthesis and characterisation of poly-urethane membranes to be used as artificial skin.

Synthesis and characterisation of asymmetric poly-imide ultrafiltration membranes.

October 1990 till October 1994

PhD study at the Research group membrane Technology, Faculty of Chemical Engineering; University of Twente.

Promoters prof.dr.ir. C.A. Smolders and prof.dr. H. Strathmann.

Promotion date 11 November 1994

Improvement of polymeric membranes for the separation of liquids and gases by means of incorporation of zeolites and the modeling of transport through these type of structures.

February 1995 till March 1996

Post-doctoral fellow at Institute of Physical Chemistry, National Research Centre Demokritos, Athens, Greece

"Study on the diffusion of small molecules in glassy polymers"

May 1996 till February 1998

Consultant membrane technology at the foundation "Membrane Application Center Twente" Enschede, The Netherlands.

Activities are: consultancy, feasibility studies, pilot studies and project management for the implementation of membrane technology in industrial processes.

February 1998 till March 1999

Director MACTbv.

Continuation of the activities of Membrane Application Center Twente on a commercial basis. Besides the activities mentioned above acquisition and general management were a part of the function.

March 1999 till now

Process engineer at Rossmark, Ede, The Netherlands

Design of water treatment installations based on conventional techniques as well as membrane technology. Supervision of pilot studies and PhD students.

From October 2001

manager of the Process Engineering dept.

<http://www.rossmark.nl>

### **Dr. Bob Carr**

Chief Technology Officer, NanoSight

UK

Dr Bob Carr is founder and CEO of Macranal Ltd having previously led an optical detection and biosensor Research Group at Porton Down for 19 years. Recently acting as lead coordinator for a DTI BEP programme on the exploitation of MicroSystems Technology in the Biosciences, Bob is a committee member of the Microsystems Manufacturing Association. Bob will be CTO post funding.

<http://www.nanosight.co.uk>



**Kevin M. McGovern**

Chairman and CEO of McGovern Capital LLC  
USA

Mr. McGovern's firm, McGovern Capital, is one of three owners of the largest manufacturer and worldwide seller of carbon filters for air and water purification, KX Industries (KXI). KXI has developed a revolutionary nanotech microbiological water filter (MB) that incorporates anti-bacterial and anti-viral agents into its structure.

<http://www.mcgoverncapital.com>



**Tim Harper**

CEO, Cientifica  
Executive Director, European NanoBusiness Association  
Spain

Tim Harper is the founder of CMP Cientifica, Europe's largest nanotechnology information company, the Executive Director of the European NanoBusiness Association and an advisor to the US NanoBusiness Alliance.

Before founding CMP Cientifica, Tim was an engineer at the European Space Agency's research and development centre in Noordwijk, The Netherlands. He managed the micro and nanoscale characterisation facility, and has published extensively on analytical techniques and characterization of advanced materials.

Tim lives in Madrid, Spain, with his family, after working in the UK, US, Germany, and the Netherlands. Originally from the UK, he also speaks French, Spanish, and Dutch.

<http://www.cmp-cientifica.com>

<http://www.nanoeurope.org>



**Diederik Jaspers**

Senior Consultant, Altran Technologies Netherlands BV  
The Netherlands

Diederik Jaspers was born in 1965 in The Netherlands. At the Delft University of Technology he studied Chemical Technology and graduated in 1991. He worked on inorganic and physical chemistry, and did research on ceramic membranes and solid oxide fuel cells. This resulted in three patents. After that he studied further at MBA, at the Erasmus University Rotterdam, The Netherlands,

where he did technology and ICT management orientation (MBI). Currently, he is the Specialist Consultant in the Skill Center Sustainability and Hydrogen at Altran Technologies Netherlands BV.  
<http://www.altran.net/nl>



**Dr. Eric Mayes**

CEO, NanoMagnetics Ltd.  
UK

Eric founded then served as NanoMagnetics' chief technology officer until being appointed CEO in 2003. Dr. Mayes brings seven years of experience in technical management and the commercialization of nanomaterials. He holds a PhD in Chemistry from the University of Bath and a BS in Physics from Arkansas State University. He is the author of over a dozen refereed academic journal articles and eight primary patents, and also serves on the UK's LINK Information Storage and Displays Programme panel to advise the DTI and EPSRC on information storage related funding. He was recently named 'Entrepreneur of the Year 2003' by the Royal Society of Chemistry.

<http://www.nanomagnetics.com>



**David E. Reisner**

Ph.D.  
President & CEO - The Nano Group, Inc  
President & CEO - Inframat Corp.  
President & CEO - US Nanocorp, Inc.  
USA

Dr. David Reisner, a 1978 University Honors graduate from Wesleyan Univ, received his Ph.D. at MIT in 1983 in the field of chemical physics. In 1996, Reisner co-founded both Inframat® and US Nanocorp® as a vehicle to develop nanostructured materials technology. Since founding, Inframat and US Nanocorp have been funded over \$20 MM in Government Contract R&D. Both Companies have been recognized in both Y2002 and Y2003 for their fast revenue growth as Deloitte & Touche Connecticut Technology Fast50 Award recipients, the first time that two companies under the same management have won as well as being the first two nanotech winners in the U.S. He is head of The Nano Group, Inc. a recently formed holding company. He is also Chairman of US Nanocorp's commercialization spin off, Battery Intelligence™ Incorporated. Reisner is very active on the Board of the Connecticut Venture Group and has recently joined the Board of the Connecticut Technology Council. He is a member of the Connecticut Academy of Science and Engineering. Reisner is serving a 3-year term as a Technology Pioneer for the World Economic Forum.

<http://www.inframat.com>

<http://www.usnanocorp.com>



**Dr. Philippe Rychen**

Head of Environmental Systems, Centre Suisse d'Electronique et de Microtechnique (CSEM SA)  
Switzerland

Mr. Philippe Rychen, Swiss and French citizen, began his studies in Chemistry and Chemical Engineering at the University of Technology in Strasbourg (France) in 1982 and continued in Aalen (D). In 1986 he received his degree in Chemical engineering (equivalent to master's degree in Science) in Aalen (D). In 1987 He started his industrial career at Christ AG, CH-Aesch, a well-established water treatment company in Switzerland with international Businesses. He started in the company as a process engineer then he became responsible as R&D director. In parallel, during two years, he built up a brand new production facility for the production of a novel product (SEPTRON Moduls) developed in House under his direction.

Before joining the CSEM team, he gained one year in Business development as a product manager at ZEOCHEM in Uetikon (CH), selling Molecular sieves (Zeolites) for the oil & gas process market. In 2000 he finally joined CSEM as a manager in order to develop the sensor and Nano-Diamond technology for the water treatment market.

This activity will be spin-off CSEM beginning of 2005 in a start-up company called "Adamant Technology" under his direction.

<http://www.csem.ch/fs/water.htm>



**Uri Sagman**

MD, FRCPC

Executive Director Canadian NanoBusiness Alliance (Toronto, Canada)

Founder & Director, C Sixty Inc.

Canada

Dr. Sagman is the co-founder and Executive Director of the Canadian NanoBusiness Alliance, an association dedicated to the promotion of the nanotechnology sector in Canada. The Canadian NanoBusiness Alliance has a diverse membership, which includes representation of government agencies, academic centers of excellence, industry and the investment community. Dr. Sagman is cofounder and President of C Sixty Inc. At C Sixty, Dr. Sagman has recruited some of the world's leading scientists, including the 1996 Nobel Prize awardee and co-discoverer of fullerenes, to advance the development of fullerene-based technology for biomedical applications. To that end, Dr. Sagman has enlisted a comprehensive R&D network, based at leading academic centers, which include Rice University, UCLA, Columbia University, Dartmouth University, the University of Toronto, Erlangen University in Germany, and the University of Taiwan. Dr. Sagman is the Chairman of GRN Health International Inc., a globally based academic research organization dedicated to medical research and development.

Dr. Sagman is currently engaged in the development of strategies for National Nanotechnology

Initiative programs in several countries, specializing in the development of paradigms for public and private sector alliances. In addition, Dr. Sagman's efforts are focused on the application of nanotechnology to problems of global scope.

Dr. Sagman is a medical oncologist, a fellow of the Royal College of Physicians and Surgeons of Canada, and a fellowship recipient of the Medical Research Council of Canada. He is a recognized researcher in the field of clinical oncology, tumor biology and immunology. Dr. Sagman obtained his training at McGill University, The University of Calgary, The University of Toronto and Oxford University. Dr. Sagman is the recipient of numerous awards and citations including the Young Investigator awards of the American Society of Clinical Oncology (ASCO) and the American Association for Cancer Research (AACR). He has organized and participated as keynote speaker at numerous nanotechnology-based conferences. Dr. Sagman has been extensively profiled in numerous journal and press publications, including Time Magazine, Newsweek, the Economist, the New York Times, Red Herring, Technology Review, Chemical Engineering, the National Post, the Houston Chronicle, and The Toronto Star amongst others.

<http://www.nanobusiness.ca>



**Fred Tepper**

President, Argonide  
USA

Fred is a former Vice President for the Mine Safety Appliance Company (MSA) of Pittsburgh, Pennsylvania. When he retired in 1996, he had almost 40 years with MSA, starting out as a chemist/materials scientist in respiratory filter development and water purification. In 1970 he was promoted to General Manager of the Catalyst Research Corp, where he led the team that developed the long life lithium pacemaker battery. He was promoted again to General Manager of the Instrument Division of MSA that included several additional profit centers including the Callery Chemical Company. While his responsibilities covered all the facets of a profit center (manufacturing, marketing, accounting), Fred was never far from the research lab.

<http://www.argonide.com>



**Professor Raphael Semiat**

Director, The Stephen and Nancy Grand Water Research Institute  
Head, GWRI Rabin Desalination Laboratory, The Chemical Engineering Department, Technion -  
Israel Institute of Technology  
Israel

Research Topics

*Water Technology*

Desalination using evaporation and membrane processes. Development of scale free desalination evaporator. Problems of membranes fouling, pre and post treatment. Uses of membranes for water

quality problems and waste treatment.

#### *Separation Processes*

Development of improved method for phase separation in liquid-liquid settlers.

Modeling of liquid-liquid settlers. Investigation of effective properties of concentrated suspensions.

Mechanisms of heat transfer enhancement. Membrane processes.

Crystallization. Nano crystallization.

#### *Industrial Project*

Double falling film evaporator for solution concentration.

Crystallization of aluminum chloride.

Water treatments.

#### *Optical measurements techniques*

Use of Laser Doppler Velocimetry for two phase-flow.

Development of Laser Grating Velocimetry technique for relatively large particles.

Study of liquid-liquid jet breakup by laser grating velocimetry.

Study of drops motion in printing heads.

Shear induced migration in concentrated slurries.

<http://wri.technion.ac.il>

<http://www.technion.ac.il/rdl>