

## Nanotechnology Perceptions\*

A REVIEW OF ADVANCED TECHNOLOGIES AND THEIR IMPACTS

### Vol. 1

№ 1, March 2005

|   |    |
|---|----|
| What is nanotechnology? <i>J.J. Ramsden</i> .....   | 3  |
| Measurement in the nanoworld, <i>G.N. Peggs</i> .....   | 18 |
| Nanotechnology and cosmology, <i>G.C. Holt</i> .....  | 24 |
| Micro and nanoprocessing techniques and applications, <i>A. G. Mamalis, A. Markopoulos and D.E. Manolakos</i> ..... | 31 |
| The music of the nanospheres, <i>J.J. Ramsden</i> .....   | 53 |

№ 2, July 2005

|  |     |
|--|-----|
| Nanotechnology—should we be worried? <i>R.W. Whatmore</i> .....  | 67  |
| Biomedical functional surface generation with control at the nanoscale, <i>A.G. Mamalis, S.N. Lavrynenko, A.I. Grabchenko, L.G. Duebner and N.M. Kirjukhin</i> ..... | 79  |
| Haptic sensing technologies for a novel design methodology in micro/nanotechnology, <i>M. Calis and M.P.Y. Desmulliez</i> .....                                      | 89  |
| A critique of the European commission's proposal for the 7th research framework programme, <i>H. Matthews</i> .....  | 99  |
| Biooptical computing and molecular optoelectronics, <i>J. J. Ramsden</i> .....   | 107 |

№ 3, November 2005

|  |     |
|--|-----|
| Nanotechnology: radical new science or plus ça change? <i>P. Moriarty</i> .....                  | 115 |
| NanoDebate .....   | 119 |
| NanoDictionary .....   | 147 |
| Semiconducting nanostructures—materials for spintronics, <i>P.J. Kervalishvili</i> .....         | 161 |
| Nanostructural elements of some high temperature semiconductors, <i>P.J. Kervalishvili</i> ..... | 167 |
| (B) The Singularity is Near, by R. KURZWEIL (reviewed by G.C. Holt) .....                        | 173 |

### Vol. 2

№ 1a, March 2006

|   |    |
|---|----|
| Essays on Nanotechnology Implications: Introduction .....   | 3  |
| Nanotechnology Dangers and Defenses, <i>R. Kurzweil</i> .....   | 7  |
| Molecular Manufacturing: Too Dangerous to Allow? <i>R.A. Freitas Jr</i> .....                                     | 15 |
| Nano-Guns, Nano-Germs, and Nano-Steel, <i>M. Treder</i> .....   | 25 |
| Molecular Manufacturing and 21st Century Policing, <i>T.J. Cowper</i> .....                                       | 27 |
| The Need For Limits, <i>C. Phoenix</i> .....  | 31 |
| Globalization and Open Source Nano Economy, <i>G. Prisco</i> .....  | 35 |
| Cultural Dominants and Differential MNT Uptake, <i>D. Broderick</i> .....   | 41 |
| Nanoethics and Human Enhancement: A Critical Evaluation of Recent Arguments, <i>P. Lin &amp; F. Allhoff</i> ..... | 47 |
| Strategic Sustainable Brain, <i>N. Vita-More</i> .....  | 53 |
| Is AI Near a Takeoff Point? <i>J.S. Hall</i> .....  | 57 |
| Singularities and Nightmares: the Range of Our Futures, <i>D. Brin</i> .....                                      | 63 |

№ 1b, May 2006

|   |     |
|---|-----|
| More Essays on Nanotechnology Implications: Introduction .....              | 83  |
| Nanoethics and Technological Revolutions: a Précis, <i>N. Bostrom</i> ..... | 85  |
| From the Enlightenment to N-Lightenment, <i>M.E. Buerger</i> .....          | 89  |
| What Price Freedom? <i>R.A. Freitas Jr</i> .....                            | 99  |
| The (Needed) New Economics of Abundance, <i>S. Burgess</i> .....            | 107 |

\* Please note the following abbreviations: (L) Letter to the Editor, (B) Book Review, (SB) Science Briefing, (MA) Matters Arising and (W) From a Correspondent.

|  |     |
|--|-----|
| Economic Impact of the Personal Nanofactory, <i>R. A. Freitas Jr</i> .....                                       | 111 |
| Corporate Cornucopia: Examining the Special Implications of Commercial MNT Development, <i>M. Vassar</i> .....   | 127 |
| Molecular Manufacturing and the Developing World: Looking to Nanotechnology for Answers, <i>D. Maclurcan</i> ... | 137 |
| Considering Military and Ethical Implications of Nanofactory-Level Nanotechnology, <i>B. Wang</i> .....          | 143 |
| Molecular Manufacturing and the Need for Crime Science, <i>D. Osborne</i> .....                                  | 151 |
| Safer Molecular Manufacturing Through Nanoblocks, <i>T. Craver</i> .....   | 155 |
| Are We Enlightened Guardians, or Are We Apes Designing Humans? <i>D. Mulhall</i> .....                           | 161 |
| CRN Task Force essays: a European commentary, <i>G.C. Holt</i> .....   | 167 |

№ 2, July 2006

|   |     |
|---|-----|
| Exploring whether ‘nano-’ is always necessary, <i>J. Harris and D. Ure</i> .....  | 173 |
| Starting off on the wrong foot: the public perception of nanotechnologies and the deficit model, <i>F. Neresini</i> ..... | 189 |
| Nanotechnology: saviour or curse in today’s environment? <i>G.C. Holt</i> .....   | 197 |
| The role of nanoelectrochemistry in nanotechnology, <i>C.M.A. Brett</i> .....   | 205 |
| The UK microsystems and nanotechnology network, <i>H. Clare</i> .....   | 213 |
| (L) <i>C. Phoenix</i> .....   | 217 |

№ 3, November 2006

|  |     |
|--|-----|
| Fullerenes—an attractive nano carbon material and its production technology, <i>M. Arikawa</i> .....                   | 221 |
| The growth of nanotechnology literature, <i>R.N. Kostoff, R.G. Koytcheff and C.G.Y. Lau</i> .....                      | 229 |
| The magic of nano, <i>D.M. Berube</i> .....  | 249 |
| The NanoDialogue project, <i>L. Amodio</i> .....   | 257 |
| Does production of the world’s highest-tonnage manufactured item often involve nanotechnology? <i>M.A. Hubbe</i> ..... | 263 |
| NEMS—emerging products and applications of nano-electromechanical systems, <i>S. de Haan</i> .....                     | 267 |
| Nanotechnology: new technology but old business models? <i>J.M. Wilkinson</i> .....                                    | 277 |
| The biological effects of nanoparticles, <i>P.A. Revell</i> .....  | 283 |

Vol. 3

№ 1, March 2007

|  |    |
|--|----|
| Where is nano taking us? <i>J. Baumberg, L. Cronin, M. Gee, M. Kearnes, P. Macnaghten, H. Makatsoris, J. Ramsden, R. O’Reilly and M. Webb</i> .....                    | 3  |
| The narrative dimension of nanotechnology, <i>E. Mordini</i> .....   | 15 |
| Nanoscience and nanotechnology initiatives in India, <i>D.K. Dutta</i> .....   | 25 |
| Challenging biomorphic sensing: the RECEPTRONICS project, <i>M. Tartagni</i> .....   | 35 |
| On the sensitivity, selectivity, sensory information and optimal size of resistive chemical sensors, <i>L.B. Kish, J. Smulko, P. Heszler and C.-G. Granqvist</i> ..... | 43 |
| (L) <i>H. Matthews</i> .....   | 53 |

№ 2, July 2007

|   |     |
|---|-----|
| Evaluating microscopic robots for medical diagnosis and treatment, <i>T. Hogg</i> .....         | 63  |
| Biological molecular motors for nanodevices, <i>J. Youell and K. Firman</i> .....               | 75  |
| Prodding the cosmic fabric with nanotechnology, <i>C. Binns</i> .....                           | 97  |
| In the beginning there were nanoparticles, <i>G.C. Holt</i> .....                               | 107 |
| Philosophy of societal impacts for nanotechnology: a pedagogical approach, <i>S. Dunn</i> ..... | 117 |
| Standardization for nanotechnology, <i>P. Hatto</i> .....                                       | 123 |
| (B) Military Nanotechnology, by J. ALTMANN .....  | 131 |

№ 3, November 2007

|  |     |
|--|-----|
| Carbon nanotubes and nanofibres, <i>B.O. Boskovic</i> .....                                | 141 |
| Single spin devices—perpetuating Moore’s law, <i>S. Bandyopadhyay</i> .....                | 159 |
| The coming invasion of the medical nanorobots, <i>S. Martel</i> .....                      | 165 |
| Scientific constructions of nanobiotechnology, <i>A. Saniotis</i> .....                    | 175 |
| The benefits of applying microsystems in radiochemistry, <i>G. Janssens-Maenhout</i> ..... | 183 |
| Prospects for environmental nanotechnologies, <i>D. Rickerby and M. Morrison</i> .....     | 193 |

|   |     |
|---|-----|
| (B) Nanotechnology Measurement Handbook: a Guide to Electrical Measurements for Nanoscience Applications, <i>by the staff of</i> KEITHLEY INSTRUMENTS ..... | 209 |
|---|-----|

## Vol. 4

№ 1, March 2008

|  |    |
|--|----|
| Editorial .....  | 3  |
| Ultraprecision machine tools—design principles and developments, <i>P.A. McKeown, J. Corbett, P. Shore and P. Morantz</i> .....  | 5  |
| Utility Fog: the machine of the future, <i>J.S. Hall</i> .....   | 15 |
| Selected papers from the First International Conference on Spin Electronics: Novel Physical Phenomena and Materials (October 2007, Tbilisi) .....  | 23 |
| Quantum interference depression in thin metal films with nanostructured surfaces, <i>A.N. Tavkhelidze, A. Bibilashvili, L. Jangidze, B. Billenberg and G.F. Rempfer</i> .....  | 25 |
| Investigation of the photostimulated crystallization and relaxation of internal mechanical pressure in silicon-on-insulator epitaxial nanostructures, <i>A. Bibilashvili, N. Dolidze, Z. Jibuti, R. Melkadze and G. Eristavi</i> .....   | 29 |
| Persistent photoconductivity and energy gap of GaAs and InP, <i>G.E. Zardas, P.H. Yannakopoulos, Ch.I. Symeonides and P.C. Euthymiou</i> .....   | 35 |
| Effect of anisotropy of optical reflexion from the (110) surface of gallium arsenide, <i>T.A. Minashvili, K.D. Davitadze and I.T. Trapaidze</i> .....  | 43 |
| The Scenario Project: Introduction, <i>M. Treder</i> .....   | 47 |
| The Center for Responsible Nanotechnology Scenario Project, <i>M. Anissimov, M. Buerger, S. Burgess, J. Cascio, S. Christensen, T. Cowper, T. Craver, F. Evitt, T. Hambling, B. Krone, L. Jandl, M. Kosal, M. Leis, P.J. Manney, H. Masum, L. O'Neill, D. Osborne, C. Phoenix, M. Rahimi, R. Rawstern, A. Rosa, D. Harries, J. Smith, M. Sonneborn, M. Treder, P. Van Nederveelde, N. Vita-More, R. Wagner, B. Wang and N. Welch</i> ..... | 51 |
| Commentary on “The Center for Responsible Nanotechnology Scenario Project”, <i>A. Nordmann and M. Kearnes</i> .....  | 65 |
| (B) Smart Nano and Micro Particles, <i>edited by</i> K. KONO AND R. ARSHADY .....  | 73 |
| (B) NanoManufacturing Handbook, <i>edited by</i> A. BUSNAINA .....   | 75 |

№ 2, July 2008

|  |     |
|--|-----|
| Harnessing the full potential of nanotechnology for wealth creation, <i>I. Gibson and S.R.P. Silva</i> .....   | 87  |
| Is public science a public good? A debate on the future of university science .....  | 93  |
| Science: exploration and exploitation, <i>J. Pethica</i> .....   | 94  |
| Science is not a public good: it is an invisible college good, <i>T. Kealey</i> .....  | 98  |
| Public science: a public good? <i>P. Moriarty</i> .....  | 101 |
| Science, technology and civilization, <i>J. Ramsden</i> .....  | 107 |
| Irresistible forces vs immovable objects: when China develops Productive Nanosystems, <i>T. Toth-Fejöl</i> .....   | 113 |
| Selected papers from the First International Conference on Spin Electronics: Novel Physical Phenomena and Materials (October 2007, Tbilisi) .....  | 133 |
| Ferromagnetism and spin dynamics in $\text{III}_{1-x}\text{Mn}_x\text{V}$ alloys, <i>J.K. Furdyna, M. Dobrowolska and X. Liu</i> .....   | 135 |
| $^{31}\text{P}$ nuclear spin qubits in a $^{28}\text{Si}$ nanowire: a scalable unit for quantum computation, <i>I. Shlimak</i> .....   | 147 |
| Few-electron systems in a quantum dot in a magnetic field: Wigner phase and broken-symmetry spin-singlet state, <i>A.A. Avetisyan, K. Mouloupoulos and A.P. Djotyan</i> .....  | 155 |
| Disorder effects in dilute magnetic semiconductors, <i>B.A. Aronson</i> .....  | 165 |
| Electroerosion dispersion-prepared nano- and submicrometre-sized aluminium and alumina powders as power-accumulating substances, <i>M.K. Monastyrov, T.A. Prikhna, A.G. Mamalis, W. Gawalek, P.M. Talanchuk and R.V. Shekera</i> ..... | 179 |
| (B) Nanoethics: The Ethical and Societal Implications of Nanotechnology, <i>edited by</i> FRITZ ALLHOF, PATRICK LIN, JAMES MOOR AND JOHN WECKERT .....   | 189 |
| (B) Nanotechnology: From the Science to the Social, <i>by</i> S.J. WOOD, R.A.L. JONES AND A. GELDART .....   | 197 |
| (SB) Negative index of refraction and metamaterials, <i>G.C. Holt</i> .....  | 201 |

№ 3, November 2008

|   |     |
|---|-----|
| Public perceptions of nanotechnology: what can we infer from early studies? <i>F. Crettaz von Roten</i> .....       | 215 |
| Commercializing nanotechnology innovations from university spin-out companies, <i>S. Lubik and E. Garnsey</i> ..... | 225 |
| Concepts in nanomechanics, <i>M.C.L. Ward</i> .....   | 239 |

Selected papers from the First International Conference on Spin Electronics: Novel Physical Phenomena and Materials (October 2007, Tbilisi)

|  |     |
|--|-----|
| Ni-rich nanoclusters in CdSb: influence on magnetic and transport properties and perspectives for spintronics, <i>E. Lähderanta, R. Laiho, A.V. Lashkul, K.G. Lisunov, I. Ojala and V. Zakhvalinskii</i> ..... | 249 |
| Obtaining p-type ZnO films by the RBQE method, <i>T.V. Butkhuzi, T.G. Khulordava, M.M. Sharvashidze, N.G. Bukhsianidze, N.G. Gaphishvili, L.T. Trapaidze, E.E. Kekelidze and R.G. Melkadze</i> .....           | 257 |
| Interferometry and scanning microscopy in asperity measurement of biomedical surfaces, <i>M. Wieczorowski, A.G. Mamalis, M. Rucki and S.N. Lavrynenko</i> .....  | 265 |
| (SB) Quantum computation with photons, <i>A. Politi and J.L. O'Brien</i> .....   | 289 |

Vol. 5

№ 1, March 2009

|   |    |
|---|----|
| The nanoscale, <i>J.J. Ramsden and J. Freeman</i> .....   | 3  |
| Stable isotopes in nanotechnology, <i>A.A. Berezin</i> .....  | 27 |
| A few lesser implications of nanofactories: global warming is the least of our problems, <i>T.T. Toth-Fejel</i> .....   | 37 |
| Localizing and detecting single spins in semiconductor nanostructures, <i>J.P. Bird and L.G. Mouroukh</i> .....   | 61 |
| Gas sensors 1. The basic technologies and applications, <i>J. Hodgkinson, J. Saffell, J. Luff, J. Shaw, J. Ramsden, C. Huggins, R. Bogue and R. Carline</i> ..... | 71 |
| Gas sensors 2. The markets and challenges, <i>J. Hodgkinson, J. Saffell, J. Luff, J. Shaw, J. Ramsden, C. Huggins, R. Bogue and R. Carline</i> .....              | 83 |

№ 2, July 2009

|  |     |
|--|-----|
| Editorial .....  | 119 |
| Microsystems for the enablement of nanotechnologies, <i>A. Iles</i> .....  | 121 |
| Carbon neutrality—what does it mean? <i>G.C. Holt</i> .....  | 135 |
| Properties of two species of deadly nano-needles, <i>C.J. van Oss and R.F. Giese</i> .....                                   | 147 |
| The bio–nano interface, <i>J.J. Ramsden</i> .....  | 151 |
| (B) Molecular to Global Photosynthesis, <i>edited by M.D. ARCHER AND J. BARBER</i> .....                                     | 167 |
| (B) Biological Nanostructures and Applications of Nanostructures in Biology, <i>edited by M. STROSCIO AND M. DUTTA</i> ..... | 171 |
| (B) Smart Nanoparticles in Nanomedicine, <i>edited by R. ARSHADY AND K. KONO</i> .....                                       | 175 |

№ 3, November 2009

|  |     |
|--|-----|
| Towards a concept system for nanotechnology, <i>J.J. Ramsden</i> .....   | 187 |
| Sustainability in a changing climate: The role of science, technology and government, <i>A. Broers</i> .....   | 191 |
| Inflammatory and immune responses induced by nanomaterials: challenges and opportunities for future nanotherapies, <i>J.R. Cubillos-Ruiz, J. Hoopes, S. Fiering and J.R. Conejo-Garcia</i> .....   | 195 |
| Limits of anti-optimization in MEMS design, <i>G. Bándi</i> .....  | 205 |
| The applicability of iron and manganese precipitation bacteria in drinking water systems, <i>D.A. Ankrah and E.G. Søgaard</i> .....  | 209 |
| The Center for Responsible Nanotechnology Scenario Project, <i>M. Anissimov, M. Buerger, S. Burgess, J. Cascio, S. Christensen, T. Cowper, T. Craver, F. Evitt, T. Hambling, B. Krone, L. Jandl, M. Kosal, M. Leis, P.J. Manney, H. Masum, L. O'Neill, D. Osborne, C. Phoenix, M. Rahimi, R. Rawstern, A. Rosa, D. Harries, J. Smith, M. Sonneborn, M. Treder, P. Van Nederveelde, N. Vita-More, R. Wagner, B. Wang and N. Welch</i> ..... | 217 |
| CRN scenarios 4 & 5: a commentary, <i>G.C. Holt</i> .....  | 227 |
| (L) <i>H. Matthews</i> .....   | 233 |

Vol. 6

№ 1, March 2010

|   |    |
|---|----|
| A Man in Process: the Meaning in the Seeking ( <i>dedicated to Prof. P.J. Kervalishvili on his 60th birthday</i> ) .....                              | 3  |
| Carbon nanotube synthesis and growth mechanism, <i>M. Kumar and Y. Ando</i> .....   | 7  |
| Using plants for directly powering nanoelectronic circuits, <i>C. Himes, E. Carlson, R.J. Ricchiuti, D.W. Taylor, B. Otis and B.A. Parviz</i> .....   | 29 |
| Surface nanomachining using scanning tunnelling microscopy with a diamond tip, <i>O. Lysenko, A. Mamalis, V. Andruschenko and E. Mitskevich</i> ..... | 41 |

|   |    |
|---|----|
| All-optical logic, <i>E.K. Wolff and A. Dér</i> ..... | 51 |
| Less is different, <i>J.J. Ramsden</i> .....          | 57 |

## № 2, July 2010

|  |     |
|--|-----|
| Editorial: The economic impact of early 21st century scientific research .....                               | 71  |
| Public Science—Public Good? <i>P. Moriarty and T. Kealey</i> .....   | 75  |
| The public perception of nanotechnology: is it all about risk? <i>C. Groves</i> .....                        | 85  |
| Nanotechnology: the ethical challenge, <i>W.R. Bowen</i> .....   | 95  |
| The Center for Responsible Nanotechnology Scenario Project, <i>J. Cascio, C. Phoenix and M. Treder</i> ..... | 104 |
| Nanotechnology scenarios: ethics and science fiction, <i>D.P. O'Mathúna</i> .....                            | 113 |
| Carbon neutrality—a government dilemma? <i>G.C. Holt</i> .....   | 121 |
| (B) Recent Advances in Nanoscience, <i>edited by M.M. MARISCAL AND S.A. DASSIE</i> .....                     | 125 |
| (B) Nanoethics: Big Ethical Issues with Small Technology, <i>by D.P. O'MATHÚNA</i> .....                     | 127 |

## № 3, November 2010

|  |     |
|--|-----|
| Understanding sustainability innovation as a social process of knowledge transformation, <i>M. Yarime</i> .....            | 143 |
| Commoditization of nanomaterials, <i>C. McGovern</i> .....   | 155 |
| What is sustainability? <i>J.J. Ramsden</i> .....  | 179 |
| Nanotechnology and nanobiotechnology—are they children of the same father? <i>A. Maitra</i> .....                          | 197 |
| (B) What Is Nanotechnology and Why Does It Matter? From Science to Ethics, <i>by F. ALLHOFF, P. LIN AND D. MOORE</i> ..... | 205 |

## Vol. 7

## № 1, March 2011

|  |    |
|--|----|
| From a fluorescent patch to picoscopy, one strand in the history of the electron, <i>P.W. Hawkes</i> .....                                       | 3  |
| Synergetic modelling of sustainable development, <i>P. Kervalishvili, B. Meparishvili and G. Janelidze</i> .....                                 | 21 |
| The impacts of nanotechnology  |    |
| Part I: Introductory material  |    |
| Part II: The main anticipated technical impacts  |    |
| Part III: Can nanotechnology contribute to tackling the grand challenges?  |    |
| Part IV: Towards a conclusion, <i>J.J. Ramsden</i> .....   | 28 |
| Charged impurity scattering of electrons in quasi-two dimensional semiconductor systems, <i>Z. Gogua, P. Kervalishvili and G. Kantidze</i> ..... | 67 |

## № 2, July 2011

|  |     |
|--|-----|
| Nanotechnology and manufacturability, <i>M.J. Kelly</i> .....  | 79  |
| Building expert consensus on problems of uncertainty and complexity in nanomaterial safety, <i>G. Hunt and M. Riediker</i> ..... | 82  |
| The phases of matter, <i>W.P. Holland</i> .....  | 99  |
| Food innovation and nanotechnology—do they go together?, <i>K. Groves, P. Titoria and W. Morley</i> .....                        | 141 |
| (MA) Carbon sequestration through forestry, <i>P. Snowden</i> .....  | 149 |

## № 3, November 2011

|  |     |
|--|-----|
| The effect of nanotechnology on mitigation and adaptation strategies in response to climate change, <i>A.G. Mamalis, J.J. Ramsden, G.C. Holt, A.K. Vortselas and A.A. Mamali</i> .....                 | 159 |
| Nanotechnology and the potential for a renewable solar future, <i>A.J. Parnell</i> .....   | 180 |
| Developing nano research in Russia: a bibliometric evaluation, <i>A.I. Terekhov</i> .....  | 188 |
| The Matter Compiler—towards atomically precise engineering and manufacture, <i>D.Q. Ly, L. Paramonov, C. Davidson, J. Ramsden, H. Wright, N. Holliman, J. Hagon, M. Heggie and C. Makatsoris</i> ..... | 199 |
| Chemical deposition of nickel with inclusion of ultradispersed diamonds, <i>A.G. Mamalis, A.I. Grabchenko, V.A. Fedorovich, J. Kundrak, Y. Babenko and T. Dovbiy</i> .....                             | 218 |
| (MA) Carbon footprint and carbon brainprint—what do they mean? <i>H. Matthews</i> .....  | 223 |

## Vol. 8

№ 1, March 2012

|  |    |
|--|----|
| Editorial: Freedom to tackle the grand challenges .....  | 3  |
| Ferritin protein nanocages—the story, <i>E.C. Theil</i> .....  | 7  |
| Forecasting Nano Law: Defining Nano, <i>I.L. Feitshans</i> .....   | 17 |
| Biological cell printing technologies, <i>A. Faulkner and W. Shu</i> .....   | 35 |
| The role of metrology and the UK National Physical Laboratory in nanotechnology, <i>C. Minelli and C.A. Clifford</i> ..... | 59 |
| Nanomedicine and future body enhancement, <i>A. Saniotis</i> .....   | 76 |

№ 2, July 2012

|  |     |
|--|-----|
| Editorial: The independence of university research .....   | 87  |
| Setting the foundations for new industries and opportunities: Summary of an international panel report .....   | 91  |
| Nanotechnology for military applications, <i>J.J. Ramsden</i> .....  | 99  |
| Principles of 3D modelling of the production and application of diamond composite materials, <i>A.G. Mamalis, A.I. Grabchenko, V.A. Fedorovich, D.V. Romashov and D.O. Fedorenko</i> ..... | 132 |
| Higher education: a risk too far, <i>G.C. Holt</i> .....   | 139 |
| The world of the smallest parts, <i>M. Dietiker, M. Vonlanthen and C. Meili</i> .....  | 149 |
| (B) Nanoscale: Visualizing an Invisible World by <i>K.S. DEFFEYES AND S.E. DEFFEYES</i> .....  | 155 |
| (B) Life in Europe Under Climate Change by <i>J. ALCAMO AND J.E. OLESON</i> .....  | 157 |

№ 3, November 2012

|  |     |
|--|-----|
| Editorial: The corporate responsibility of universities .....  | 167 |
| Prevention of manufacturing defects of diamond composite materials by simulating the process at the micro level, <i>A.I. Grabchenko, D.V. Romashov, D.O. Fedorenko, V.A. Fedorovich, A.G. Mamalis and J. Kundrak</i> ..... | 171 |
| Nanomaterials applications in “green” functional coatings, <i>J. Miao, K.W. Wong, W. Li, S.H. Ng, L.H. Keung, K.H. So, I.Y.M. Ho, R.K.C. Luk, L. Cai, C. Cheng, G.Y.Y. Tsang and P.W. Lee</i> .....                        | 181 |
| Development of the US National Nanotechnology Initiative in its First Decade, <i>J.M. Malin</i> .....  | 190 |
| Nanotechnology: is it the exploitation of quantum effects? <i>G.C. Holt</i> .....  | 195 |
| Designed synthesis of nanoparticles for a sustainable world, <i>V. Jamier, M. Varon, E. Gonzalez and V. Puentes</i> .....  | 205 |

## Vol. 9

№ 1, March 2013

|   |    |
|---|----|
| Editorial: The moral leadership of universities .....   | 3  |
| Co-creative Value Manufacturing: a methodology for treating interaction and value amongst artefacts and humans in society, <i>N. Nishino</i> .....  | 6  |
| The promise and challenges of nanovaccines and the question of global equity, <i>T. Stammers, G. Hunt and Y.J. Erden</i> .....  | 16 |
| The Phases of Matter (continued), <i>W.P. Holland</i> .....   | 28 |
| Formulation and solution of the boundary value problem of viscous liquid flow in a nanotube taking external friction into account, <i>R. Gogsadze, A. Prangishvili, P. Kervalishvili, R. Chikovani, V. Gogichaishvili and N. Jibladze</i> ..... | 57 |
| On a possible limit to economic progress, <i>J.J. Ramsden and G. Kiss-Haypál</i> .....  | 71 |

№ 2, July 2013

|   |     |
|---|-----|
| The offshore wind energy nano-industry, <i>J. Platts</i> .....                      | 91  |
| Nanogold’s chemical revolution, <i>J. Emsley</i> .....                              | 96  |
| The nanotechnology industry, <i>J.J. Ramsden</i> .....                              | 102 |
| Assessing the toxic risks of the nanotechnology industry, <i>J.J. Ramsden</i> ..... | 119 |

## № 3, November 2013

|   |     |
|---|-----|
| Editorial: The role of government in science .....  | 143 |
| Modelling of dispersion quality of carbon nanotubes in thermosetting blends for capacitive behaviour enhancement of composite materials, <i>K. Papageorgiou, G. Maistros and A. Koufaki</i> .....   | 147 |
| Carbon films for photovoltaic devices, <i>S.O. Rudchenko, A.T. Pugachov, V.E. Pukha, V.V. Starikov, S.N. Lavrynenko and A.G. Mamalis</i> .....  | 159 |
| Intensive electron emission in a strong electric field in vacuum nanoelectronics and high-power electronics, <i>G.N. Fursey</i> .....   | 167 |
| Determination of the diamond wheel structure in high-speed grinding using nanoindentation techniques: experimental and numerical simulation, <i>A.G. Mamalis, A.I. Grabchenko, D.V. Romashov, D.O. Fedorenko, D. Lagoudas, V.A. Fedorovich and J. Kundrak</i> ..... | 187 |
| Public awareness and perception of nanotechnology in Malaysia, <i>S. Suhaimee, T. Serin, A.K. Ali, N.H. Sulaiman and Z. Ghazali</i> .....   | 198 |

## Vol. 10

## № 1, March 2014

|   |    |
|---|----|
| Editorial: Incoherence in EU science policy .....   | 3  |
| Common law and nanotechnology: the issue of toxicity in tort litigation, <i>K. Hester, M. Mullins, F. Murphy and S.A.M. Tofail</i> .....  | 7  |
| Regulation of nanotechnology: developing a level regulatory playing field for emerging materials, <i>C. McGovern</i> .....  | 24 |
| Nanoparticle communications: from chemical signals in nature to wireless sensor networks, <i>S. Qiu, W. Guo, M. Leeson, S. Wang, N. Farsad and A. Eckford</i> .....   | 29 |
| Simulation of the effect of sintering on the integrity of diamond grains in grinding wheels, <i>A.I. Grabchenko, D.V. Romashov, D.O. Fedorenko, A.G. Mamalis, D. Lagoudas, V.A. Fedorovich and T. Baxevanis</i> ..... | 42 |
| Synthesis and characterization of mechanically milled nanocomposites—carbon nanotube-reinforced aluminium, <i>M. Tayyab, M. Mutahir, M. Sajid and A. Ali</i> .....  | 54 |
| (SB) Cloaking devices: progress with metamaterials, <i>G.C. Holt</i> .....  | 61 |

## № 2, July 2014

|  |     |
|--|-----|
| Editorial: The scope of nanotechnology .....   | 79  |
| Decommissioning of the Chernobyl (Ukraine) nuclear power plant: the intermediate spent fuel storage ISF-2 project, <i>F. Maltini</i> .....   | 81  |
| Technology of semiconductor materials sensitive to different regions of the electromagnetic radiation spectrum, <i>N.P. Khuchua, N.D. Dolidze, N.G. Gapishvili, R.G. Gulyaev, Z.V. Jibuti, R.G. Melkadze and M.G. Tigishvili</i> ..... | 91  |
| Climate change and the complexity of solutions for securing energy supply: the global Energy [R]evolution, <i>F. Maltini</i> .....   | 100 |

## № 3, November 2014

|   |     |
|---|-----|
| Editorial: Gullibility .....  | 151 |
| Obtaining a ZnSe furnace charge from aqueous solution, <i>D.S. Sofronov, E.M. Sofronova, N.O. Kovalenko, V.V. Starikov, A.S. Gerasimenko, V.N. Baumer, A.M. Lebedinsky, P.V. Matejchenko, E.V. Grishina, S.N. Lavrynenko and A.G. Mamalis</i> ..... | 154 |
| Snowflakes, snow crystals, hail and rain, <i>W.P. Holland</i> .....   | 164 |
| Nanotechnology and Gaia, <i>J.J. Ramsden</i> .....  | 173 |

## Vol. 11

## № 1, March 2015

|   |   |
|---|---|
| Editorial .....   | 3 |
| Surface science in photography, <i>R. Hofmann</i> ..... | 5 |

|   |    |
|---|----|
| Lab-on-a-chip: Why aren't we all hypochondriacs?, <i>G.C. Holt</i> .....  | 20 |
| Risks of nanotechnology in the food industry: A review of current regulation, <i>A. Azamat and S. Kunal</i> ..... | 27 |
| Scientific convergence in the birth of molecular biology, <i>S.Y. Auyang</i> .....                                | 31 |
| Can you beat the commodity fraudsters?, <i>C.M. Howard</i> .....  | 55 |
| (W) Exceptional Times, <i>S.A. Kadir</i> .....  | 61 |

## № 2, July 2015

|  |     |
|--|-----|
| Editorial: Maintaining national ascendancy .....   | 75  |
| Energy security of the Southern Caucasus: opportunities and challenges, <i>A.G. Tvalchrelidze and P.J. Kervalishvili</i> .....   | 88  |
| The critical temperature and the atmosphere, <i>W.P. Holland</i> .....   | 106 |
| (B) Advances in Applied Nanotechnology for Agriculture (ACS Symposium Series 1143), <i>edited by B. PARK AND M. APPELL</i> ..... | 116 |
| (W) Man's increased efficiency at work is influenced by his wife, <i>S.A. Kadir</i> .....  | 118 |

## № 3, November 2015

|   |     |
|---|-----|
| Editorial: The future of Wikipedia .....  | 131 |
| The nucleus of an atom and the periodicity of the elements, <i>W.P. Holland</i> ..... | 136 |
| Photocatalytic antimicrobial coatings, <i>J.J. Ramsden</i> .....                      | 146 |
| An unhealthy obsession with fluoride, <i>D. Cross</i> .....                           | 169 |
| (W) The care of VIPs, <i>S.A. Kadir</i> .....   | 186 |

**Vol. 12**

## № 1, March 2016

|  |    |
|--|----|
| Editorial: Britain and the EU .....  | 3  |
| Nature or a question of development: East and West; freedom, culture, religion and science, <i>P.J. Kervalishvili</i> .. | 15 |
| How can we face critical problems of humanity in our era?, <i>K.N. Spentzas</i> .....                                    | 17 |
| Doomsday scenarios: an appraisal, <i>J.J. Ramsden</i> .....  | 35 |
| Il Mediterraneo ancora una volta al centro della storia, <i>G. Belingardi</i> .....                                      | 47 |
| (MA) Whither Wikipedia?, <i>D. Cross</i> .....   | 50 |

## № 2, July 2016

|  |     |
|--|-----|
| Editorial: The future of cities .....  | 63  |
| Aircraft cabin air contamination and aerotoxic syndrome—a review of the evidence, <i>F. Cannon</i> ..... | 73  |
| A paradigm shift to sustainable evolution through creation of universal ties, <i>S. Watanabe</i> .....   | 100 |
| (B) Watermelons by <i>J. DELINGPOLE</i> .....  | 130 |

## № 3, November 2016

|  |     |
|--|-----|
| Editorial: Outsourcing public services .....   | 147 |
| A review of graphene radio frequency applications: Now and beyond, <i>T. Leng, X. Huang, K.H. Chang, J.C. Chen, X. Zhang and Z. Hu</i> .....       | 153 |
| Hospital infection control: Ultraviolet germicidal irradiation's role in the war against infectious diseases, <i>D. Jones</i> .....                | 165 |
| A boundary problem of micro- and nano-electronics, <i>R. Gogsadze, A. Prangishvili, P. Kervalishvili, R. Chiqovani and V. Gogichaishvili</i> ..... | 173 |

**Vol. 13**

## № 1, March 2017

|   |   |
|---|---|
| Foreword: Smart Sensor Systems for Self-Care, <i>P. Thomas and I. Rafi</i> .....                                      | 3 |
| The role of self-care and the use of smart sensors in the UK's health provision, <i>R. Sullivan and I. Rafi</i> ..... | 5 |



|   |    |
|---|----|
| Does health spending need to outpace GDP per head?, <i>P. Thomas</i> .....  | 17 |
| Corroboration of the J-value model for life-expectancy growth in industrialized countries, <i>P. Thomas</i> ..... | 31 |
| The take-up of near-patient testing (lab-on-a-chip), <i>G.C. Holt</i> .....                                       | 45 |
| Applying digital early warning systems to healthcare, <i>L. Pearce</i> .....                                      | 55 |
| Home-based care: Implications for education and insurance providers, <i>R. Summers and R. Wheatcroft</i> .....    | 61 |
| Can smart sensor systems save the NHS?, <i>J.J. Ramsden</i> .....   | 69 |
| (B) From Science to Start-Up: The Inside Track of Technology Entrepreneurship by A. SETHI .....                   | 81 |

№ 2, July 2017

|   |     |
|---|-----|
| Editorial: Education .....  | 95  |
| How <i>not</i> to win over a concerned public—the history of “fracking” in Fylde, Lancashire, <i>M. Turner</i> .....        | 105 |
| Assessing technological innovation: A necessary uphill struggle, <i>D. Callahan</i> .....                                   | 113 |
| Evolutionary and archaeological perspectives on estimating the likelihood of civilization collapse, <i>C.M. Smith</i> ..... | 116 |
| The nuclei of atoms in Periods 4, 5, 6 and 7, <i>W.P. Holland</i> .....   | 123 |
| Demarcation of the absurd in nanotechnology, <i>J.J. Ramsden</i> .....  | 128 |
| Obsolete assumptions, <i>G.R. Sampson</i> .....   | 132 |
| (W) Guardian angel, <i>S.A. Kadir</i> .....   | 137 |

№ 3, November 2017

|   |     |
|---|-----|
| Editorial: Administrative failure .....   | 151 |
| The effect of different nanoshells on the solar–thermal conversion of microencapsulated phase-change material, <i>A. Tong</i> ..... | 161 |
| And lo, the monster blackout was born. Data center security and black sky hazards, <i>A.R.E. Taylor</i> .....                       | 169 |
| Shortage of engineers, <i>P. Wedderburn-Ogilvy</i> .....  | 182 |
| Parents and education and schools, <i>P. Inson</i> .....  | 190 |
| (SB) Ultrasonic heating, <i>A. Bakhtiari, T.M. Berberashvili and P.J. Kervalishvili</i> .....                                       | 203 |
| (W) Handling, not managing, others, <i>S.A. Kadir</i> .....   | 210 |