

Earth Essay: The Promise and Wisdom of Nanotechnology

By Stephanie Lynne Thorburn

Abstract

Earth Essay is a fundamental paper. The work is advocating progressive, technological solutions and co-ordinated, holistic education for the benefit of both individuals and government to ensure a safe transitional phase toward a secure future for Earth and all its diverse incumbents. The work explores comparable approaches on environmental policy and the seductive wisdom of Nanotechnology. The author addresses the profile of the U.S. National Nanotechnology Initiative, especially the organisation's work within the Environmental Protection Agency and NASA, utilising further a strategic case study of Nanospire, Inc. The role of Oxford University Continuing Education is examined in relation to its vocational courses on Nanotech and the wider ethical/social context of new controversial technological developments. Finally, the less conventional contribution of space sciences and Kepler Space Institute are highlighted. The author proposes that the ethos of KSI offers a missing link in 21st-century progressive education, illuminating the latent potentials inherent to humanity's projected future. The paper is constructed with reference to Frank White's concept of the *Overview Effect*.

Key concepts: Environmental Sociology, Sustainable development, Nanotechnology, eco centrism, techno centrism, the Overview Effect, space sciences, transformative studies, techno humanism.

Social Theorists: Max Weber, Raymond Murphy, Frank White, Adriano Autino.

I dedicate my *Earth Essay* to the *International Association of Metaphysical Practitioners* (IAMP) and the *International Natural Healers Association* (INHA). The IAMP are the founders of the *One Planet Accord* initiative – I am a proud ambassador of *One Planet*.

Introduction

There are few persistent political issues that have frustrated me more fundamentally than the degradation of our natural environment. As a Reiki Master, I am innately a lover of Earth. My perspective on the increasing crisis humanity faces in relation to the environment is not stereotypical and has curiously not changed greatly over the past decade. As a student of environmental sociology, I learnt before recent ecological issues entered our mass media that our environment was causing much concern amongst scientists, politicians, and environmental groups. The available resolutions from a sociological perspective penetrate beyond the relatively limited social discourses that we are presented with on a day-to-day basis.

Sustainable development principles are taught amongst many counter viewpoints on social theory courses and the politically correct, palatable nature of the theory of this so-called gardening vision can be dissected critically in light of more fundamental, philosophical, and practical approaches. In a previous in-depth essay published in

the American Chronicle,¹ I discussed the origins and applications of sustainable development, eco feminism, deep ecology, “techno-centrism,” “eco-centrism,” and social ecology in more depth. Hence, these are hotly debated concepts, interrelated to core sociological theories such as Max Weber’s notions of rationalisation in contemporary industrial societies.² I feel that fuller consideration of such holistic sociological theoretical insights would diversify the available discussion points and potential resources available to journalists and politicians alike, as the crisis continues to worsen in context of our changing climate and natural world.

Earth’s Environmental Demise: The Necessity of Co-ordinated, Progressive Technological Solutions & Holistic Education.

My work “The Astrosociological Imagination”³ was received well within the niche market of those familiar with space advocacy issues, yet was not disseminated by all with an open mind. The reason for this is social myopia in regard to the initial labelling process when receiving information of a more unfamiliar persuasion in the public domain. The impersonality and sheer volume of information being digested would appear to lead, on occasion, to a limited ethos of inclusivity and a reactionary response. My essay in context was addressing one potential and more radical solution to our environmental problems than sustainable development via a resonance with the views of the *Space Renaissance Initiative Manifesto*, by Adriano Autino et al.⁴

As a writer and researcher, I am willing to be flexible in researching and discussing a range of progressive arguments in response to the challenges of our Earth’s future. I have been disappointed at the lack of support at a practical funding level and a lack of sufficient progress in social perceptions of the potential contribution of technology for the benefit of humanity and of the space industry *per se*. Advances are definitely being made nevertheless, slowly but surely, in relation to didactic and social aspects of space sciences and cutting edge technology. Further, there are increasingly better approaches to holistic education in connection with Earth’s future and our quality of life. I will explore these notions a little further, as I believe the concepts are at the heart of my own techno humanist perspective.

Environmental Problems and the Viable Resolutions.

In a nutshell, I believe that a growing population, the undermining of the rainforest, our continuing dependence on fossil fuels, and the gradual depletion of species on Earth is a serious matter that should not simply be left to conjecture or viewed with

¹ “The Astrosociological Imagination & the Space Renaissance Initiative. A Discourse Analytical Perspective,” by Stephanie L. Thorburn can be found in PDF on the Space Renaissance philosophy papers archive: www.spacerenaissance.org/papers/Abridged_STR.pdf. The work draws from the founding principles of Prof. Gerard O’Neill, who advocated space sciences in relation to ecological issues to assist in our search for clean, practical energy sources and protection from industrial pollution. See Gerard O’Neill, *The High Frontier: Human Colonies in Space* (New York: William Morrow, 1977).

² Ibid. My study explored Max Weber’s notion of rationalisation in contemporary industrial societies through the work of Raymond Murphy, particularly *Rationality and Nature: A Sociological Inquiry into a Changing Relationship* (Boulder CO, West View Press, 1994), Chapters 1-5 and 9.

³ “The Astrosociological Imagination: The Challenge of Human Progress” was published in the *Journal of Space Philosophy* 1, no. 1 (2012): 43-49.

⁴ *The Space Renaissance Manifesto* by Adriano Autino, Prof. Patrick Collins, et al. can be accessed at www.spacerenaissance.org/papers/The_Space_Renaissance_Manifesto.pdf.

deterministic eyes. Day to day there are constantly more natural disasters of potentially anthropogenic and non-anthropogenic origins. Our climate and seasonally determined weather are increasingly intertwined through dysfunctionality (winter in spring, drought surpassed by flooding, and the constant failure of basic crop production).

A solution may not be impossible, but there is a definite lack of consensus in policy and action, with our seemingly inevitable fate barely being circumvented. Continuing persistent doomsday editorials in science journals and the broadsheet press are prevalent at this time.⁵

Better and more diverse education is needed and not merely a relaying of the latest strategy or directive on sustainable development. Not only are these measures being implemented in a manner that is not effective, but they are also at times rather moot to the point. Recycling through a belief in economy of consumption and energy is very sensible when considered at face value. However, even if these policies were implemented perfectly at a local and national level, there remains the question as to whether recycling is just a sticking plaster in capitalist culture. Preventing shoppers from using adequate bags or stopping people in developed nations from drinking bottled water are rather miserable measures, lacking deeper response and insight, often creating an even more miserable social milieu. We need to be moving forward socially and technologically, not returning to regressive modernist ideals. The environmental movement needs to be progressing towards a more modern, egalitarian, advanced, energy-efficient future, not backward toward Victorian hygiene and health standards. I would point out that I myself advocate organic and home-grown produce and I believe that given a balanced approach, the best aspects of sustainability could be integrated into a more satisfactory environmental strategy.

Nanotechnology?

Fundamentally I would support the precepts of techno humanism; a concept that utilises the benefits of technology to assist humanity. Often advanced technology rarely seems to enter into the debate about our increasingly exhaustive consumption of fossil fuels. Fossil fuels are a finite resource, one that we cannot assume will remain viable for future generations, and an option we cannot afford as consumers right now! Investment in more advanced approaches to our energy crisis is essential and the potential benefits of nanotechnology need to be considered fully. As with nuclear power debates, there remains a range of safety and ethical concerns with the development of nanotechnology – however, if governments were to legislate and integrate policy encompassing the promise of nanotech resolutions thoroughly, our future might be that bit more secure. Further, the incessant guilt and regret at human's carbon footprint and technocentric excesses would not be as severe with sufficiently consolidated progress. Such anthropocentric progress would be viewed in the context of a maturing society that has evolved at times through primitive developmental stages.

⁵ An example of recent pessimistic press warnings of rising CO₂ levels can be cited via *The Guardian* Environmental Network. See editorial by Fen Montaigne, *The Guardian*, May 14, 2013: www.guardian.co.uk/environment/2013/may/14/record-400ppm-co2-carbon-emissions.

Nanotechnology Definitions and the Promise of Nanotechnology.

A Profile of the National Nanotechnology Initiative.

The parameters and role of Nanotechnology to nurture progress in so many areas from health care to the environment are discussed very succinctly on the National Nanotechnology Initiative (NNI) government website. The organisation was established in 2000 and now comprises 27 federal agencies. The vision and goals of the NNI are expressed as the creation of a future punctuated by a revolution in technology and industry, with clear societal benefits. The NNI is a co-ordinated and well-articulated organisation, founded in the discovery and deployment of nanoscale science and technology to serve the public good, via ethical research and development. The NNI and affiliated agencies are working toward four central goals:

1. [To advance world-class nanotechnology research and development;](#)
2. [To foster the transfer of new technologies into products for commercial and public benefit;](#)
3. [To develop and sustain educational resources, a skilled workforce and the supporting infrastructure and tools to advance nanotechnology;](#)
4. [To support the responsible development of nanotechnology.](#)⁶

The NNI's website offers a treasure trove of pertinent information regarding the development of nanotechnology itself, ethical issues, and the scale of efficacy for such new technologies. The ethos is the development of technology to benefit the environment, public, and economy, rather than the systematic degradation of the natural environment, often associated with the process of progress and industrialisation. The key working-group areas follow: Global Issues and Nanotech, Nanotechnology; Environmental and Health Implications, Nanotechnology; Industry Liaison; Innovation and Nanotechnology; Public Engagement; and Communications. The NNI's programme component areas include consideration of nano phenomena processes, materials, standards, research, education, and society. In 2013, the NNI was apportioned \$1.8 billion in the federal budget.

Inspiring the Next Generation of Scientists.

Significant federal partners of the NNI include the U.S. Food and Drug Administration and NASA. The more inspiring and sci-fi ambitions of nanotechnology can be considered via the collaboration between the goals of NASA and nanotech. NASA is orientated toward the future in space exploration, science research, and aeronautics research. NASA's role in nanotech is focussed on developing innovative concepts in electronics, computing, sensors, and advanced miniaturization systems. Recent successes include nano-aluminium, ice rocket propellant, nano-structured composites for thermal isolation applications, and smart electroactive materials. Projects include flight demonstrations on the Shuttle, International Space Station, and DoD flight opportunities. These recent significant developments technologically are certainly inspiring and promising too, for the next generation of scientists, working with and innovating through nanotechnology.

⁶ See www.nano.gov.

For a fuller assessment of the work of the NNI, please investigate its website archives, educational initiatives, and forthcoming 2014 projects further through the organisation's homepage: www.nano.gov/about-nni/what/vision-goals.

"Earth Essay: The Promise and Wisdom of Nanotechnology" has been truncated. For the original transcription and full discussion on the promise and wisdom of Nanotechnology, see *Stephanie Lynne Thorburn*, "Progressive Etudes": <http://slthorburn.edublogs.org/2013/05/22/earth-essay-the-promise-wisdom-of-nanotechnology/>

The work also includes an examination of:

- Environmental discourse and the contemporary media.
- A strategic assessment of the contribution of space sciences and progressive education for the benefit of the environment and society.

Recommended Further Reading

Rickerby, D. G., and M. Morrison. "Nanotechnology and the Environment: A European Perspective." *Science and Technology of Advanced Materials* 8, no. 1-2 (January 31, 2007): 19-24. doi:10.1016/j.stam.2006.10.002

This paper offers a balanced scientific appraisal of the contribution of nanotechnology to the environment, in relation to the potential of metal oxide nanocatalysts to offer protection from industrial pollution. Energy-related applications for nanotech include nanostructured electrode materials that improve the performance of lithium ion batteries. This analysis is counterbalanced by equal assessment of the relatively unknown consequences and dangers of nanoparticles on the environment and their potential for toxicological effects. The process of life cycle analysis is advocated in risk assessment, together with methods of recycling and recovery of nanomaterials.

Reference and Resource Links.

The *Astrosociology Research Institute* (www.astrosociology.org) contains plenty of papers on space sciences, social science, and the environment.

The *Centre for Nanotechnology in Society* (www.cns.ucsb.edu/about) is an excellent society offering interdisciplinary research, grants, and diverse opportunities. The organisation aims to integrate regulators, educators, industrial scientists, and policy makers in the domain of Nanotechnology.

Journal of Space Philosophy <http://bobkrone.com/node/120>

Kepler Space Institute (www.keplerspaceinstitute.org).

National Nanotechnology Initiative (www.nano.gov).

Nanospire Incorporated (www.nanospireinc.com): Advanced cavitation.

Oxford University Continuing Education (www.conted.ox.ac.uk).

Socioastronomy research site (www.socioastronomy.webs.com).

Space Renaissance Initiative (www.spacerenaissance.org).

Stephanie Lynne Thorburn, author homepage (www.stephaniethorburn.webs.com).

The Overview Institute (www.overviewinstitute.org).

Web links accessed February 9, 2014.

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About the Author: Stephanie Lynne Thorburn holds an MA in Sociology from Goldsmiths College in London with a combined honours degree in Sociology and Psychology from the City University, London. She is working on her doctorate degree. She is a Fellow of the Institute for Meridian Psychology and Associated Complementary Therapies. She is a freelance writer with vocational Diplomas and research interests in holistic health, graphic arts, parapsychology, and computing and more recently she has been researching into nanotechnology applications for Earth and for Space.



Editors' Notes: This is Stephanie Lynne Thorburn's second contribution to *The Journal of Space Philosophy* (See Fall 2012, article #12). She is a member of the Board of Editors for the Journal. Her entire article will be a nanotechnology education for readers. Her statement: "The ethos is the development of technology to benefit the environment, public, and economy, rather than the systematic degradation of the natural environment, often associated with the process of progress and industrialisation" is a valuable summary for the goals of pursuing nanotechnology science and technology. **Bob Krone and Gordon Arthur.**