



NANOYOU – LIST OF RESOURCES FOR TEACHERS ON NANOTECHNOLOGIES

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¹ PU = Public
PP = Restricted to other programme participants (including the EC services).
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ABOUT THIS DOCUMENT:

Below is a list of on-line resources, textbooks, books, DVDs, movies, magazines and journals where to find information about nanotechnology and ELSA and safety topics related to it. There are also listed resources developed specifically for teachers. This information will be also available through the NANOYOU project website www.nanoyou.eu, and constantly updated.

ON-LINE RESOURCES (Information on nanotech)

- **Project on Emerging Nanotechnologies (www.nanotechproject.org):** This is a project run by the Woodrow Wilson International Center for Scholars. This is probably one of the best places on-line where to find information on nanotechnologies, including safety and ELSA issues. This project has created a number of very good reports (under “publications”) that can be downloaded (or you can request a print copy). Here you also find presentations, videos, webcasts etc. of very interesting meeting and panels. Here you also find a Consumer Product Inventory of all products commercialized that claim to contain some form of “nano”.

- **Science 2020, www.2020science.org:** this is the personal blog of Andrew Maynard, Chief Science Adviser at the Woodrow Wilson International Center for Scholars Project on Emerging Nanotechnologies. This is a brilliant blog, with a lot of interesting posts about nano-related articles and debates. You can also ask or comment directly and Andrew is quick in answering!

- **RSC website, <http://www.nanotec.org.uk>:** here you find the report free to download :“Nanoscience and nanotechnologies: opportunities and uncertainties, by The Royal Society and The Royal Academy of Engineering 2004. This is the report that kick-started all the debate about the safety of nanotech.

- Nanotechnology in the European Commission, <http://cordis.europa.eu/nanotechnology/> :Specific documents are ‘Towards a European Strategy for nanotechnology’ (COM (2004) 338), and ‘Nanoscience and nanotechnology: An action plan for Europe 2005-2009’ (COM (2005) 243).

- **National nanotechnology Initiative (NNI), www.nano.gov:** The NNI is the biggest US initiative on nanotech, funded by the Government. Teaching resources <http://www.nano.gov/html/edu/eduteach.html>.

ON-LINE RESOURCES (Material for teachers/trainers)

- **Nanosense project, www.nanosense.org:** this is probably the biggest project oriented at making training materials for teachers. There are some very good PDFs free to download that cover aspects such as, teaching nanoscience in school, ideas on how to integrate nanoscience in a chemistry or physic curricula, as well as background documents, PPTs, exercises etc. This project was founded by the National Science Foundation (NSF)

- **<http://mrsec.wisc.edu/Edetc/>:** the biggest educational portal in terms of material, lesson plans, lab exercises, etc. made by scientists together with experts of communication precisely about nanoscience. It had some material for teachers. This is an educational portal of the University of Wisconsin-Medison, with funding also from NSF.

-**(Nanoscience Informal Education Network) NISE network, www.nisenet.org:** this is one of the best network of informal educators and it has material for schools, as well as science exhibits, nano-days etc. Members of the network can share ideas etc. Some of the material has been reviewed by the teachers and their comments are reported. Very good. The experiments mostly are a refined version of the ones developed by the Wisconsin-Madison University (above). Funded by the NSF.

- **Accessnano, www.accessnano.org:** this is an Australian educational resource for secondary school s. Lots of material and very well done. It has an industry-application focus. Accessnano is an Australian government initiative funded through the Australian Office of Nanotechnology, under the Department of Innovation,

Industry, Science and Research in working with the Department of Education, Employment and Workplace Relations. AccessNano has been produced by foresight and science communications consultancy Bridge8 Pty Ltd. The material was developed in close collaboration with industry, academia and science teachers across Australia. Partners are also Nanotechnology Victoria (www.nanovic.com.au). Nanotechnology Victoria Ltd (Nanovic) is a venture for delivering nanotechnology research outcomes to Victorian industry. It is a venture of 3 major universities, and also receives funding from the Australian Government.

- **Nano Education Portal** : <http://www.nanoed.org/>, this is a big web educational portal with educational resources, news, seminars etc on teaching nano at school (all levels). Funded by NSF.

- **Nano what?**, <http://www.nanowhat.co.uk/teach/> .Educational portal developed by the University of Nottingham. Has materials for teachers and videos.

- **Nano School Box**: <http://www.nanobionet.de/publications.htm>. This box was developed during the FP6 European project Nano2Life which had academic and industry partners. It was produced by a private company that was part of the project called NanoBioNet (<http://www.nanobionet.de/eng.htm>). It costs 235 Euros plus VAT.

- **Nano-lessons in a box**. http://www.nano-cemms.uiuc.edu/content/education/education_kits/index.php: this is an educational kit that was developed with funding from NSF and Motorola. A teacher can get the kit free, use it, but it must send it back within 2 weeks.

- **NanoBits Education Kit**:

<http://www.nanovic.com.au/index.php?a=education.resources%20for%20schools.nanobits%20kit&p=361>.

This is an educational kit for teenagers and young adults, developed by nanotechnology Victoria. It is sold by a private company (<http://www.nanogoodsandservices.com/products.html>).It costs 120 ASD.

ON-LINE (Specifically about nanotech and ELSA & safety)

-**NANOCAP Project (www.nanocap.eu)**. This is an FP6 project, now completed, that has dealt with nanotech and ELSA, safety and workers issues. In the nanocap.eu website you can find an "ethics portfolio" which was written specifically for NT. In this website you can find several references on nanoethics.

- **ObservatoryNano (http://www.observatorynano.eu/project/)**: this an FP7 project, here you can find some reports on nanotech (applications) which are easy to read and relatively comprehensive. Under the heading "societal issues" there is a section dedicated to nanoethics and a very good "ethics toolkit"

- **2020 Science (www.2020science.org)**: here you find a blog with the list of **the best 10 places** where to find information about nanotechnology safety and ELSA. I recommend you look at these! See: <http://2020science.org/2009/09/14/nanotechnology-safety-ten-useful-resources/>

- **Nano & Me (www.nanoandme.org)**: this is a new and brilliant website, easy to ready, practical info about applications of nanotech, safety and impact in society (ELSA)

TEXTBOOKS²:

- **Introduction to Nanoscience** by Gabor L. Hornyak (Author), H.F. Tibbals (Author), Joydeep Dutta (Author), Anil Rao (Author): This is an excellent textbook written for undergraduate (university) level. It is detailed and very well written. It focuses on nanoscience, not much on its application.

- **Fundamentals of Nanotechnology** by Gabor L. Hornyak (Author), John J. Moore (Author), H.F. Tibbals

² All books and textbooks are available at www.amazon.com

(Author), Joydeep Dutta (Author). This textbook is ideally the continuation of the above one, but it is not necessarily to buy both. This focuses more on the application (rather than basic science) of nanotech. Brilliant, well written, very comprehensive. Does not cover safety and ELSA.

READING BOOKS (Short)

- **Nanotechnology: Basic Science and Emerging Technologies** by Mick Wilson (Author), Kamali Kannagara (Author), Geoff Smith (Author), Michelle Simmons (Author), Burkhard Raguse (Author): this book is for those who need an introduction to basic concepts of nanoscience and nanotech. It is easy to read, and not too specialized, but it does offer a lot of examples of real nanotech research.

- **Nanotechnology: A Gentle Introduction to the Next Big Idea** by Mark A. Ratner (Author), Daniel Ratner (Author): this book is a little bit more technical than the above-mentioned one, but it is easy to read and again has a lot of examples of real nanotech research.

MOVIES AND DVDs

- **Talking NANO** 6-DVD set: this is a fantastic DVD set. It provides a basic introduction to nanotechnology, potential applications, implications, and impacts. Designed for classroom, informal, and professional development use, the videos are tightly edited with close-ups and illustrations. The set is available at cost (34.99 USD) from <http://www.talkingnano.net>, along with detailed content information, clips, and reviews.

- **NanoInLife**: this is a recent movie by Directorate General for Research (Matteo Bonazzi distributed few copies during the training days). It is good, easy to understand, covers basics and applications. Watch for free at: <http://www.athenaweb.org/programs/summary/nanotechnology-nanofilters-chip-oled-nanomedicine-1001004.html> NB. The site www.athenaweb.org has numerous videos (free) very good about nano. Just put "nano" in the search field and you will get many!

MAGAZINES, JOURNALS

- **NANO magazine** (<http://www.nanomagazine.co.uk/>): this is a good magazine to get easy-to-read articles about nanotech. It is low on hype and covers also controversial aspects like regulation, toxicity, ELSA etc. Some articles are available on-line, for some you need a subscription.

- **Nature Nanotechnology and others**: Nature Nanotech is a peer-reviewed journal with excellent articles about nanotech (specialized reading). Other very good journals are Science, Nature, Small, Advanced Materials, Nano Today, and many more. You need a subscription.

- **Nanotation** (<http://community.acs.org/nanotation/Home/tabid/36/Default.aspx>): this is a good website where to find latest information on research published in ACS (American Chemical Society) journals. It has also a community area, "ask a scientist" etc.