

Curriculum Vitae of Ilan Chabay

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Home address: 6921 Carlynn Court, Bethesda MD 20817 USA US citizen and resident
Mobile: +49 171 563 8381 worldwide except US; +1 240 888 6034 (used only in the USA)
Email: ilan.chabay@iass-potsdam.de skype: ilangcplus

EDUCATION:

Ph.D. in Chemical Physics (1972), Thesis: "First Measurements of Circular Dichroism in the Infrared," George Holzwarth, thesis supervisor, University of Chicago, Chicago, IL

Special Program on Infrared Spectroscopy Techniques (1969), Massachusetts Institute of Technology (MIT), Cambridge, MA

B.A. in Chemistry with additional emphasis in American Intellectual History, Physics, and Mathematics. (1966), Clark University, Worcester, MA

HONORS, AWARDS, AND PATENTS:

Elected Honorary Member of the Swiss Academy of Humanities and Social Sciences, May 2012, "in recognition of his manifold contributions to innovative forms of public understanding of science as well as teaching and learning."

Appointed Erna and Victor Hasselblad Professor of Public Learning and Understanding of Science in March 2006, a new endowed Chair situated jointly in the Sociology Department at the University of Gothenburg and at Chalmers University of Technology, Gothenburg, Sweden. In January 2009, the Chair was moved to the Department of Applied Information Technology at Chalmers.

American Association for the Advancement of Science (AAAS), 1999: First recipient of the Alan B. Leviton Award for "Outstanding achievement in the science education of children and youth." The award cited the creativity, artistry, playfulness, and scientific integrity of Ilan's work and his long-standing commitment to science education.

Three patents awarded for games and toys based on scientific phenomena. Two toys were produced and sold under license agreement in 1991 with Educational Insights, Inc and one toy in 2003 - 2006 with Dowling Magnets, Inc.

National Research Council & National Bureau of Standards (now called National Institutes of Standards and Technology, NIST) Postdoctoral Fellowship: Analytical Chemistry Division, NIST, Gaithersburg, MD, 1974 - 1975.

National Institutes of Health Postdoctoral Fellowship in Biophysical Chemistry, Chemistry Department, University of Illinois, Urbana, 1972 - 1974.

National Science Foundation Undergraduate Research Grant, Chemistry Department, Clark University, Worcester, MA 1963 - 1965.

CURRENT PROFESSIONAL EMPLOYMENT:

Senior Advisor for Global Sustainability Research, Institute for Advanced Sustainability Studies, Potsdam, Germany 2016 -

The conceptual frame of my work is understanding the interplay between knowledge production, learning processes, and collective behavior change at multiple temporal and spatial scales across different levels of societies. This is also the mission of the Knowledge, Learning, and Societal Change Alliance (www.KLASICA.org), which I have chaired since 2008. A particular interest to me is understanding decision making and collective behavioral change through modeling and narratives as analytical and affective lenses respectively.

KLASICA is based upon the network of researchers who developed the Science Plan of the Knowledge, Learning, and Societal Change Alliance, which was approved in 2011 by the International Human Dimensions Program in Global Environmental Change (IHDP). KLASICA is now based in IASS. A KLASICA workshop on collective behavior change toward sustainable

futures was held in February 2016 at IASS to identify the analytical, epistemological, and methodological resources needed to more adequately address substantive questions of transformative societal change. The output from the workshop will be used in subsequent symposia to analyze empirical evidence for success or failures of collective behavior change in the context of sustainability. The symposia will provide a platform to examine lessons learned from a wide range of international projects with varying degrees of perceived success or failure, including projects that did not narrowly or intentionally focus on behavior, but which nonetheless may yield valuable information on transformation through collective behavior change. The first case study symposium will be held in November 2016 in Taipei at the Risk Society and Policy Research Center of the College of Social Science at National Taiwan University. The theme is "collective behavior change in Asian and Pacific island and isolated communities"

CURRENT PROFESSIONAL ACTIVITIES:

- Chair of International Research Alliance "Knowledge, Learning, and Societal Change: finding paths to a sustainable future" (www.KLASICA.org) (2009 -)
- Member of Advisory Board, University of Kassel, Germany Center for Environmental Systems Research (2016 -)
- Scientific Advisory Board of "Affordable Energy for Humanity" program of the Waterloo Global Science Initiative and Karlsruhe Institute of Technology (2015 -)
- Chair, KREYON Scientific Advisory Board (kreyon.net) - an action research project on social dimensions of creativity and innovation (2015 -)
- Member of Advisory Board, ZIRIUS Center for Interdisciplinary Risk and Innovation Studies, University of Stuttgart, Germany (2012 -)
- Honorary Member, Swiss Academy of Humanities and Social Sciences (2012 -)
- Member, Global Climate Forum (www.globalclimateforum.org) (2012 -)
- Scientific Steering Committee, Future Earth Integrated Risk Governance Project (2010 -)

PRIOR PROFESSIONAL EMPLOYMENT:

Professor and Senior Fellow, Institute for Advanced Sustainability Studies, Potsdam, Germany 2012-2015

At IASS from 2013-2016, I was also co-leading an inter-disciplinary research team on ecological, social, and economic transformations in the Arctic (focusing on the Eurasian Arctic of western Russia and Norway and on western Greenland) enabled by climate change, accelerated by resource extraction and utilization, and interacting in feedback loops with the non-Arctic regions of the world (<http://www.iass-potsdam.de/en/content/sustainable-arctic-futures-regional-and-global-challenge>). The goals are to a) enable transformative pathways towards sustainable Arctic futures salient for and valued by stakeholders*, b) facilitate informed and effective decision making by stakeholders at multiple governance levels and spatial scales by using co-designed scenarios to consider plausible and feasible options and their consequences, c) understand the interplay between regional and global systems within the Arctic and their impacts within and beyond the Arctic, and d) iteratively refine our understanding of transformation, transformative pathways, and trans-disciplinary research by learning from the project outcomes and processes.

*The term "stakeholders" is used here to be inclusive of rights-, stake-, and shareholders in and outside the Arctic

Professor, Helmholtz Alliance Energy Trans, Institute for Social Science, University of Stuttgart, Germany 2012-2014

Alcatel/Lucent Fellow in Communications Research, International Center for Technology and Culture (IZKT), University of Stuttgart, Germany 2014

Erna and Victor Hasselblad Professor of Public Learning and Understanding of Science for Sustainability (PLUS), University of Gothenburg and Chalmers University of Technology, Gothenburg, Sweden, March 2006 - November 2011

From March, 2006 through December 2008, I held the Victor & Erna Hasselblad Foundation Professorship endowed jointly at Chalmers University of Technology and University of Gothenburg (Göteborg), Sweden and situated in the Sociology Department at University of Gothenburg. In January 2009, I moved my Chair to the Department of Applied Information Technology at Chalmers.

With the generous and visionary support of the Hasselblad Foundation, the most important overall strategic contribution I made during my tenure in Gothenburg is the deepening and broadening of the intellectual basis and framework of public learning, understanding, and use of science (PLUS) in the context of the global and local challenges of sustainability.

Activities as Hasselblad Professor:

Founded and directed the Gothenburg Center for PLUS (gcPLUS) from July 2006 to December 2010. The mission of gcPLUS is understanding and facilitating how the public learns and uses science and technology needed to build a sustainable global society. The focus of gcPLUS is on supporting movement toward local and global sustainability by conducting research and public outreach activities related to: 1) communication and use of science for governance, 2) building capacity for socially relevant innovation by facilitating effective communication and learning processes among scientists, engineers, policy makers, and the many facets of the public, and 3) facilitating inclusion of a wide spectrum of people across cultures who have not been adequately represented and supported in adapting appropriate sustainable practices to their circumstances and livelihoods.

The New Curiosity Shop®, a California corporation design and development workshop, September, 1983 – March, 2006

Founder and President

2001 – 2006: *Consulting* on science communication and innovative learning programs, exhibitions, and games grounded in science and technology with an emphasis on engaging people in learning science over sustained periods, especially adolescents, and expanding public dialogues on science-related issues in diverse communities.

1983 – 2000: *Consulting plus design, development, and production* of interactive exhibitions and learning experiences for museums, science centers, government agencies, corporations, and schools worldwide.

Founded the first company in the world to design and produce complete inexpensive hands-on science exhibits for museums and visitor centers. Over more than 20 years, these products contributed to improving the quality of science learning experiences available to many millions of children and adults all over the world.

Held full financial responsibility for the company including: Developing and presenting business plans for venture funding, raising venture capital from individual investors, managing relationships with company's Board of Directors, negotiating contracts and directing outside legal support, handling all personnel actions, and directing R & D and production teams.

Built the company's reputation for expertise in science education and as a source of highly popular elegant, innovative, scientifically sound learning experiences for over 230 institutions in 16 countries, including Disney's EPCOT Center, IBM Japan, Smithsonian Institution National Museum of American History, Franklin Institute Science Center, New England Aquarium, Mirador Science Center in Santiago, Chile, Singapore Science Center, US National Academy of Sciences, and the National Aeronautics and Space Administration (NASA).

Developed and tested concept of "Guerilla Science," which uses existing commercial infrastructure and marketing budgets of businesses, rather than public funds, to engage children and parents in learning about science under the guise of entertainment. Placed resources for science learning in educationally under-served neighborhoods and promoted

engagement of parents and caregivers in learning with children. Game-like entertainment products and toys based on science were purchased to attract and retain customers in business locations. Products were sold to companies, including Shop Rite grocery stores, Royal Caribbean Cruise Lines, Pizza Hut, and McDonald's. They were also effective in urban medical clinics where children often waited for long periods of time with little, if any worthwhile stimulation.

Conceived of and directed the establishment of a rural science education program, which served up to 105 small, isolated schools on the Western Slopes of Colorado with workshops for teachers and parents and special hands-on exhibits for classroom use. Children become more excited by learning and teachers were inspired, gained confidence in teaching science, and began to develop more resources on their own as a direct result of their experience with the project. Begun in 1986, the project influences the Aspen Science Center in Aspen, CO and an outgrowth of the project continues to operate on a small scale in Carbondale, CO.

Conducted workshops on inquiry-driven, active learning focused on the process of science for teachers and parents in elementary and secondary schools in the US, Russia, and Japan

NASA Office of Space Science, Washington, DC / Jet Propulsion Lab, Pasadena, CA, 2003 – 2006

Member of Leadership and Planning Group for the Education Framework in the Office of Space Science, Oct. 2003 – 2006:

Director of Design Team for NASA's Science Educational Framework, April, 2004 – April, 2005

Directed the design of an innovative web site that provides a coherent, context-rich guide for different user groups (educators, curriculum developers, and scientists communicating with the public) to find specific resources among the vast array of exciting NASA educational materials on earth and space science and understand the context and relevance of the materials. The design is a forerunner of a contextual data-mining system that both lay and expert users can use easily.

University of the West of England, Faculty of Applied Science, Bristol, UK 2004:

Visiting Professor

Member of a team teaching a two-year Master's degree (MSc.) program in science communication. Responsible for aspect of course called "science direct" on communicating science to a diverse public through a variety of media, including graphical materials, exhibitions, games, and events.

NASA Goddard Space Flight Center, Universities Space Research Association, Greenbelt, MD 2002

Science education consultant

Collaborated with the high energy astrophysics group to organize and conduct a week-long workshop for middle and high school teachers from the US, Canada, and Italy on the origins of elements in the universe. The workshop included guiding the development of classroom activities designed by the teachers and tested in their classrooms prior to NASA's publication of the activities in Spring, 2003. See <http://imagine.gsfc.nasa.gov/docs/teachers/Elements2002/>. for more information.

American Institutes for Research, Palo Alto, CA, 1991 -1992:

Consulting Scientist

Directed planning for a study of implicit and operational knowledge developed during use of sets of conceptually related hands-on activities by children at elementary grade levels.

College of Notre Dame, Belmont, CA, 1989:

Distinguished Visiting Professor

Held special one-semester endowed professorial chair under the auspices of The Sister Catherine Julie Cunningham Visiting Professorship. Taught an introductory physical science course and gave a series of public lectures on science and pre-college science education.

Stanford University, Stanford, CA, 1984 - 1988:

Consulting Professor of Chemistry

Developed and taught lecture and laboratory courses for undergraduates, including group theory and spectroscopy, physical chemistry, and instrumental analysis.

Universidad Nacional, Bogota, Colombia, March, 1983:

Visiting Professor

Presented lectures for physics faculty of Colombian universities at the invitation of the Asociacion Pro Centro Internacional de Fisica on "Modern Optical Spectroscopy" with an emphasis on richer content and better strategies for teaching at a college level.

The Exploratorium, a science museum, San Francisco, 1982 - 1983:

Associate Director

Represented the Exploratorium in meetings with federal, state, and local government agencies that resulted in increased visibility and funding for the Exploratorium and led to expanded collaborative programs and projects.

Supported Director's (Dr. Frank Oppenheimer) fundraising activities, including identifying donors, arranging fund-raising meetings, and making presentations to potential donors.

Held significant responsibility for aspects of long-term strategic planning, including building renovation and expansion.

Managed planning for special exhibitions and family programs and classes.

Guided development of selected exhibits by museum staff and artists-in-residence.

Organized and hosted "Speaking of Music" arts performance/discussion series for the public.

Institutes for Molecular Science, Okazaki, Japan. November 1980 - July 1981:
invited and sponsored by the Japanese Ministry of Education, Science, and Culture

Distinguished Visiting Professor

Set up laser spectroscopy laboratory for faculty and graduate students based on methods originally developed in my laboratory at NIST (see below). Presented lectures on my research at 18 major research institutions and universities throughout Japan.

National Institutes of Science and Technology (NIST) [formerly called the National Bureau of Standards] Gaithersburg, MD, 1975 - 1982:

Senior Research Scientist, Project Leader, and Principal Investigator:

Conducted research and directed research groups in developing new, more accurate and sensitive methods of molecular detection and measurement using laser spectroscopy and other techniques

Invented first fundamentally accurate measurement technique for determination of airborne particle sizes using the Doppler shift of laser light scattered from falling particles.

Developed several important new methods for chemical analysis of particles, solutions, surfaces, and reactive mixing using spontaneous and coherent stimulated laser Raman spectroscopy.

Contributed to the elucidation of the mechanism of surface-enhanced Raman spectroscopy and its use for high sensitivity molecular analysis.

Began a program (despite lack of administrative approval or support at the time) that brought middle and high school students into my NIST laboratories and involved them in the process of doing fundamental chemistry and physics research on weekends and over

the summer. Two former students who began working with me while in middle school are now very successful professors of physics at major research universities in the US.

Organized and moderated a unique series of chamber music performance plus discussion events by professional musicians at NIST, Gaithersburg, MD (1975 – 1980).

SELECTED PRIOR APPOINTMENTS AND PROFESSIONAL ACTIVITIES

- Member of the International Scientific Committee of the International Human Dimensions Programme for Global Environmental Change (IHDP), (2008 - 2014)
- Member of the Global Systems Dynamics and Policy coordination and support action project of the European Commission, 2010 - 2013
- Chair of the IHDP Special Task Force on Governance and Communication, February 2009 - September 2010
- Member of the Science & Technical Committee of the UN International Strategy for Disaster Reduction (UN-ISDR), August 2008 - August 2012.
- Co-chair of science planning committee developing a new 10-year core research initiative in IHDP on "Knowledge, Learning, and Societal Change: finding paths to a sustainable future" 2008-2011
- Member of forward look of the European Science Foundation (ESF) & European Cooperation in Science and Technology (COST) "Responses to Environmental and Societal Challenges for our Unstable Earth" (RESCUE), 2009-2011.
- Member of European Panel on Sustainable Development (EPSD) - Early Childhood Education network, 2009 - 2010
- CYSCC - the Children and Youth Science Centers of CAST (Chinese Association for Science and Technology) - is producing and distributing copies of science exhibits that I designed in my former company, the New Curiosity Shop®. The exhibits are used in a fleet of nearly 300 trucks. I conducted workshops on inquiry- and experience-based learning for CYSCC staff on the trucks in China.
- Appointed Othmer Visiting Professor in Science, Technology, and Society at the International Christian University, Mitaka, Japan, September 2009
- Chair of scientific program committee for 2008 biannual international conference on Public Communication of Science and Technology, PCST-10 in Malmö, Sweden and Copenhagen, Denmark, June 2008.
- Member of an international working group sponsored by the Norwegian Foreign Ministry, which prepared a report for the United Nations on the 20th anniversary of the 1987 Brundtland Commission's report, "Our Common Future." Report was presented at UN Conference on Sustainability, New York, May 8, 2007.
- On advisory board for ForskarsFredag (European Union sponsored Researchers' Day activities with the public) organized by Vetenskap & Almänhet (Science and Public, a non-profit research organization), Stockholm 2007 - 2009.
- National Endowment for Science Technology and Arts (NESTA) Futurelab, UK, October, 2002 participant and team leader in invitational workshop entitled "Enabling Science Education Through Interactive Simulations And Immersive Spaces."
- World Bank Center for International Leadership seminar: "The Challenge of Leadership" February, 2002 and January, 2003: Invited participant in workshops for World Bank executives on ethical challenges of economic, educational, and political leadership.

OTHER ACTIVITIES AND INTERESTS:

Tutored students during 1962-70 from disadvantaged families in Worcester and Chicago. Two students remain in contact with me and update me on their careers as a nationally recognized theater director and a successful and popular physician.

Helped develop an alternative educational program as a "freedom school" for black children in Crawfordville, Georgia in 1965 with the Southern Christian Leadership Council.

Member of Board of Directors, Nuclear Disarmament Forum, San Francisco and Center for Innovative Diplomacy, Palo Alto, CA, 1982 – 1987: a non-profit organization dedicated to promoting public understanding of issues critical to disarmament and foreign policy.

Able to converse in German and Japanese, with a basic (but rapidly decreasing) knowledge of Swedish, Spanish, and Russian.

Hold a private pilot's license for single engine land aircraft in the US and have flown a variety of single and twin-engine aircraft over the past 30 years, but am no longer current.

Organized and led small groups in 3-6 week backpacking expeditions in Alaska, British Columbia, and Yukon Territory wilderness areas - all pre-GPS and cell phones - and trekking to Mt. Everest in Nepal to rendezvous with friends in the successful 1976 American Everest Expedition.

PUBLICATIONS AND INVITED LECTURES:

Articles in international peer-reviewed journals, books, and book chapters:

1. Chabay, I. (2016) forward to Participatory Sensing, Opinions and Collective Awareness (Understanding Complex Systems) Loreto, V. et al. (Editors) Springer International, Switzerland.
2. Chabay, I., Frick, M., Helgeson, J., eds. (2016) Land Restoration: reclaiming landscapes for a sustainable future, Elsevier Academic Press ISBN: 978-0-12-801231-4 (in print and online).
3. Schmale J, von Schneidemesser E, Chabay I, Maas A, Lawrence M. "Building Interfaces That Work: A Multi-stakeholder Approach to Air Pollution and Climate Change Mitigation." In: Drake, J.L., Kontar, Y.Y., Eichelberger, J.C., Rupp, T.S., Taylor, K.M. (eds). Communicating Climate-Change and Natural Hazard Risk and Cultivating Resilience, vol. 45. Springer International Publishing, (2016) pp 65-76.
4. Li, H., Chabay, I., Renn, O., Weber, A., Mbungu, G. "Exploring smart grids with simulations in a mobile science exhibition" *Energy, Sustainability and Society* (2015) **5**:37 DOI: 10.1186/s13705-015-0066-4
5. Chabay, I. (2015) "Responding To Challenges Of Rapid Global Change By Strengthening Local Science, Math, Engineering, and Technology Education" in International Science and Technology Education: Exploring Culture, Economy and Social Perceptions, Renn, O., Karafyllis, N.C., Hohlt, A., Taube, D. eds., Berlin-Brandenburg Academy of Sciences, Rutledge Press.
6. Chabay, I., (2015) "Narratives for a Sustainable Future: Vision and Motivation for Collective Action" in B. Werlen editor Global Sustainability, Cultural Perspectives and Challenges for Transdisciplinary Integrated Research, Springer International Publishing, Switzerland.
7. Schmale, J., D. Shindell, E. von Schneidemesser, I. Chabay, M. G. Lawrence (2014) "Clean Our Skies: Coupled Human-Atmosphere-Systems: Improve air quality and mitigate climate-change simultaneously" Comment in *Nature* **515** 335-337
8. C. Stöhr and I. Chabay, "From Shouting Matches to Productive Dialogue – Establishing Stakeholder Participation in Polish Fisheries Governance." *Int. J. Sustainable Development*, Vol. **17**, No. 4, (2014)

9. C. Stöhr, C. Lundholm, B. Crona, I. Chabay, "Learning platforms and sustainable fisheries: An integrative framework for assessing adaptive co-management processes" *Ecology & Society* **19**(3): 14 (2014)
10. J. Schmale, A. Maas, I. Chabay, M. G. Lawrence, "Co-designing Usable Knowledge with Stakeholders and Fostering Ownership – A Pathway through the communication problem?" proceedings of the Impacts World 2013, International Conference on Climate Change Effects, Potsdam, Germany
11. J. D. Tàbara and I. Chabay, "Coupling Human Information and Knowledge Systems with social–ecological systems change: Reframing research, education, and policy for sustainability," *Environmental Science and Policy* **28** 71–81 (2013)
12. I. Chabay "Sustainability and Science Education" in Springer online *Encyclopedia of Science Education*, R. Gunston, editor <http://www.springerreference.com/index/chapterdbid/331080> Springer-Verlag Berlin Heidelberg 2013
13. J. Helgeson, S. van der Linden, I. Chabay, "The role of knowledge, learning and mental models in public perceptions of climate change related risks" chapter in *Learning for Sustainability in Times of Accelerating Change*, A. Wals, P. B. Corcoran, eds., pp. 329–346 Wageningen Academic Publishers, 2012.
14. S. Cornell, F. Berkhout, W. Tuinstra, Tàbara, J. D., Jäger J., Chabay, I. de Wit, B., Langlais, R., Mills, D., Moll, P., Otto, I., Petersen, A., Pohl, C., van Kerkhoff, L. "Opening up knowledge systems for engagement with global environmental change." Special Issue on "Responses to Environmental and Societal Challenges for our Unstable Earth (RESCUE)" project. *Environmental Science and Policy* **28** 60-70 (2013).
15. Blackmore, C., Chabay, I., Collins, K., Gutscher, H., Lotz-Sisitka, H., McCauley, S., Niles, D., Pfeiffer, E., Ritz, C., Schmidt, F., Schreurs, M., Siebenhüner, B., Tàbara, J.D., van Eijndhoven, J. (2011) "Knowledge, Learning, and Societal Change: Finding paths to a sustainable future" <http://klscproject.org/wp-content/uploads/2014/04/KLSC-Science-Plan-v2.9-110904.pdf>
16. J. Helgeson, S. Dietz, I. Chabay, (2010) "Analyzing Preferences over Climate-Related Risks: Proposed Mental Models" in proceedings of the International Society for Ecological Economics, September, 2010.
17. C. Stöhr and I. Chabay, (2010) "Science and Participation in Governance of the Baltic Sea Fisheries," *Environmental Policy and Governance*, **20**(5) 350-363
18. I. Chabay (2010) "Voices at the table: participation, collaboration, and ownership in social-ecological issues" in *Overcoming the Challenges of 'Doing Participation' in Environment and Development: Workshop Summary of Lessons Learned and Ways Forward*, John Forrester and Åsa Gerger Swartling (eds), Stockholm Environmental Institute Working Papers, 2010.
19. C. Stöhr, O. Stepanova, I. Chabay, (2010): "Wissenschaft und Partizipation. Eine Fallstudie zum Fischereimanagement in der Ostsee." In Halfmann, J., Morisse-Schilbach, M. (Ed.): *Wissen, Wissenschaft und Global Commons. Konturen eines interdisziplinären Forschungsfeldes*. Series: Internationale Beziehungen edited by DVPW Sektion Internationale Politik. Nomos, Baden-Baden.
20. I. Chabay (2010) "Learning, Knowing, and Behaving: Education and Adaptation to Global Change" in *Glocal Environmental Education*, Y. Himiyama, R. B. Singh, F. Kanda, J. Hindson, eds., Rawat Publications Jaipur, India 2010.
21. W. Ammann, I. Chabay, H. Gupta, G. McBean, V. Murray, "Reducing Disaster Risks through Science Issues and Actions: The Full Report of the ISDR Scientific and Technical Committee 2009" report for the UN Global Platform, Geneva, June 2009.
22. I. Chabay, "Connecting Visual Representation and Conceptual Understanding of Models of Complex Systems," chapter in a book produced from the Dahlem Conference on *Is There a Mathematics of Social Entities?* December 2008, C. Jaeger and R. Klein, eds, Potsdam Climate Research Institute, Germany.

23. T. Hennes, I. Chabay, "From Looking Environment to Learning Environment: The Networked Aquarium of the 21st Century," *Marine Technology Society Journal*, May, 2001.
24. I. Chabay, "Learning Science In and Beyond Museums," Guest Editorial, *Chemistry & Engineering News*: **77**(17), April 26, 1999 American Chemistry Society, Washington, DC.
25. I. Chabay, "Big Exhibits from Small Toys Grow (and Vice Versa)," in Sharing Science: Issues in the Development of Interactive Science and Technology Centres, The Nuffield Foundation, London, 1989.
26. I. Chabay, "Flow Commotion and Crystal Spider: Translating Scientific Concepts into Hands-on Learning Devices," in Science Learning in the Informal Setting, Symposium Proceedings, P. G. Heltne, L. A. Marquardt, eds., Chicago Academy of Sciences, 1988.
27. I. Chabay, "Hands-on Science Exhibits for Teaching and Learning Science and Technology in Developing Countries," in Popularizing Science in Developing Countries Symposium Proceedings, AAAS national meeting, Los Angeles, May, 1985; edited by James Cornell, published through the International Science Writers Association, 1986.
28. R A Fletcher, I Chabay, D A Weitz, J C Chung, "Laser Desorption Mass Spectroscopy of Surface-Adsorbed Molecules," *Chem. Phys. Lett.* **104**: 615 (1984).
29. I Chabay, "A Role in Chemical Education for Science Museums: Criteria for Development of Interactive Chemistry-Related Exhibits," Division of Chemical Education, American Chemical Society, March 1983.
30. I Chabay, "The Bigger They Are, the Harder They Fall: Aerosol Size Measurements by Doppler Shift Spectroscopy," in Measurement of Suspended Particles by Quasi-elastic Light Scattering, B Dahneke, editor, Wiley Interscience, NY (1983) [invited review].
31. I Chabay, "Optical Waveguides: Photon Plumbing in the Chemistry Lab: Fiber Optics, Waveguides, and Evanescent Waves as Tools for Chemical Analysis," *Analytical Chemistry* **54**: 1071A (1982) [invited review].
32. I Chabay, "Observations on Scientific Research and the Research Environment at the Institute for Molecular Science in Okazaki, Japan," *Scientific Bulletin of the Office of Naval Research, Tokyo* **6**: 48 (1981).
33. R Dornhaus, R E Benner, R K Chang, I Chabay, "Surface Plasmon Contribution to Surface Enhanced Raman Scattering (SERS)," *Surface Science* **101**: 367 (1980).
34. R A Fletcher, D S Bright, I Chabay, "Low Reynolds Number Fluid Flow Induced by Settling Aerosol Particles as Measured by the Particle Doppler Shift Spectrometer," *J. Phys. Chem.* **84**: 1611 (1980).
35. D S Bright, R A Fletcher, I Chabay, "Particle Doppler Shift Spectrometer: Accurate Size Determination of 5 - 15 Micrometer Aerosols," *J. Phys. Chem.* **84**: 1607 (1980).
36. R A Fletcher, G W Mulholland, I Chabay, D S Bright, "Calibration of an Optical Particle Counter by Doppler Shift Spectrometry in the 4 - 8 Micrometer Range," *J. Aerosol Sci.* **11**: 53 (1980).
37. J C Shaefer, I Chabay, "Generation of Enhanced Coherent Anti-Stokes Raman Spectroscopic (CARS) signals in Liquid-Filled Waveguides," *Optics Letters* **4**: 227 (1979).
38. I Chabay, G J Rosasco, T Kashiwagi, "Species Specific Raman Spectroscopic Measurements of Concentrations in Unsteady Flow," *J. Chem. Phys.* **70**: 4149 (1979).
39. D S Bright, I Chabay, "Measuring Aerosol Particles," *Chemtech* **9**: 694 (1979) [invited review].
40. I Chabay, D S Bright, R A Fletcher, "Particle-Sizing Device for Research and Calibration," National Bureau of Standards DIMENSIONS, page 17, December, 1978.
41. I Chabay, G J Rosasco, T Kashiwagi, "FFT Analysis of Raman Intensities: A Probe of Concentration Fluctuations in Turbulent Flow," *Proc. Sixth International Conf. On*

- Raman Spectroscopy, (Bangalore, India, 1978); Schmid, et al, editors, Heyden and Son, Ltd., 2 516 (1978).
42. I Chabay, G J Rosasco, T Kashiwagi, "Non-Intrusive Technique Measures Concentration Fluctuation in Turbulent Gas Flow," National Bureau of Standards DIMENSIONS, page 22, April, 1978.
 43. I Chabay, D S Bright, "Measurement of the Size Distribution of Liquid and Solid Aerosols by Doppler Shift Spectroscopy," J. Coll. Interface Sci. 63: 304 (1978).
 44. I Chabay, G J Rosasco, E S Etz, "Alternative Techniques for Fiber Characterization: Particle Size Distribution Measurement by Doppler Shift Spectroscopy and Chemical Identification by Micro-Raman Spectroscopy," Proc. of FDA Symposium on Electron Microscopy of Microfibers, FDA Publication No. 77-1033, page 181 (1977).
 45. I Chabay, "Measurement of Aerosol Size Distribution with a Particle Doppler Shift Spectrometer," National Bureau of Standards Special Publication 464: 175 (1977).
 46. B S Hudson, W Heatherington, S Cramer, I Chabay, G K Klauminzer, "Resonance Enhanced Coherent Anti-Stokes Raman Scattering," Proc. Nat'l. Acad. Sci. 73: 3798 (1976).
 47. I Chabay, G K Klauminzer, B S Hudson, "Coherent Anti-Stokes Raman Spectroscopy (CARS): Improved Experimental Design and Observation of New Higher Order Processes," Appl. Phys. Lett. 28: 27 (1976).
 48. I Chabay, G Holzwarth, "Infrared Circular Dichroism and Linear Dichroism Spectrometer," Appl. Opt. 14: 454 (1975).
 49. I Chabay, "Rapid Measurement of Droplet Size Distributions by Optical Heterodyne Spectroscopy," National Bureau of Standards Special Publication 412: 65 (1974).
 50. J P Gollub, I Chabay, W H Flygare, "Laser Heterodyne Study of Water Droplet Growth," J. Chem. Phys. 61: 2139 (1974).
 51. J P Gollub, I Chabay, W H Flygare, "Optical Heterodyne Measurement of Cloud Droplet Size Distributions," Appl. Opt. 12: 2838 (1973).
 52. G Holzwarth, I Chabay, N A W Holzwarth, "Infrared Circular Dichroism and Linear Dichroism of Liquid Crystals," J. Chem. Phys. 58: 4816 (1973).
 53. I Chabay, "Absorption and Scattering Circular Dichroism of Cholesteric Liquid Crystals in the Infrared," Chem. Phys. Lett. 17: 283 (1972).
 54. G Holzwarth, I Chabay, "Optical Activity of Vibrational Transitions: A Coupled Oscillator Model," J. Chem. Phys. 57: 1632 (1972).
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Reports:

56. K. Keil, I. Chabay, T. Wiertz, "Engaging Stakeholders in Interdependent Arctic and Global Change: Developing the SMART Research Project" IASS Working Paper, April 2014
57. A. Serra, J. D. Tàbara, I. Chabay, "Assessing the role of vertical and horizontal communication in disaster risk reduction learning and planning: The case of the Spanish Tous dam-break, 1982" Report for the UN ISDR for mid-term review of the Hyogo Framework for Action, December 2010.
58. I. Chabay, J. David Tabara, Christian Pohl "A new vision of knowledge systems" report for forward look "Responses to Environmental and Societal Challenges for our Unstable Earth" (RESCUE) for the European Science Foundation & COST, April 2010.
59. I. Chabay, B. Siebenhüner, J. van Eijndhoven, M. Schreurs "Earth Systems Governance from the Perspective of the Knowledge, Learning, and Societal Change IHDP Initiative" *IHDP UPDATE* November 2009

60. I. Chabay, C. Stöhr, O. Stepanova, Report to the Baltic Sea 2020 Foundation, Sweden, May 2008: "Facilitating Governance of Baltic Seas Fisheries By Improving Communication Among Stakeholders"
61. I. Chabay "From Research to Social Change: The Case of Ecosystem Services" in *IHDP UPDATE* extra edition, August 2008
62. O. Stepanova, C. Stöhr, I. Chabay, Report for Vetenskapsrådet (Swedish Research Council), January, 2008: "Scientists' Engagement in Public Communication of Science in Sweden: A preliminary study of motivations, incentives, and practices"
63. I. Chabay and M. Letell, Report written at the request of the Swedish Research Council, Vetenskapsrådet, December 2006: "National Strategies for Public Science Communication: Sweden's approach in light of strategies adopted by other countries"
64. I Chabay, "Build A Working Model of the Internet in Your Classroom – No Computer Needed!" a hands-on, minds-on technology activity for K – 12 schools, on web site of National Academy of Engineering (USA) for National Engineering Week, 2002
65. Chabay, B. Friedman "Frozen Bubbles: A Chemistry Experiment for Elementary, Secondary, and College Students" A teacher's guide to a hands-on chemistry, physics, & biology exhibit, The New Curiosity Shop, 1987.
66. F Oppenheimer, I Chabay, R Semper, "Proposal for the Development of Regional Exhibit-Based Teacher Training Centers Located in Public Science Centers and Museums," written testimony, National Science Board Commission on Precollege Education in Mathematics, Science, and Technology, March 26, 1983
67. I Chabay, F Oppenheimer, "Testimony before [US] House Subcommittee on Elementary, Secondary, and Vocational Education," Congressional Record, September 30, 1982

Selected invited and keynote lectures (2008 -):

1. Future Earth International Webinar on the Transformations Knowledge Action Network (TKAN) "Collective Behavior Change: the KLASICA action research agenda" June 2016
2. National Taiwan Normal University, Taipei "Understanding And Enabling Collective Behavior Change Toward Just and Equitable Sustainable Futures" May 2016
3. Research Institutes for Humanity and Nature, Tokyo strategic symposium: keynote "Researching Pathways To Sustainable Futures With And For Stakeholders" March 2016
4. Technische Universität, Berlin "Linking Social And Technical Innovation For Sustainable Futures" December 2015
5. IIASA Laxenburg, Austria "Making Meaning and Making Decisions For Sustainable Futures In The Eurasian Arctic" December 2015
6. University of Rome - La Sapienza "Nurturing Curiosity, Collaboration, And Creativity Across Disciplinary Silos" September 2015
7. Caux Dialogues on Land and Security, Caux, Switzerland: facilitated workshop on "Diverse Knowledge Systems For Governance of Sustainable Land Use" July 2015
8. Hochschule für Gestaltung, Schwäbisch Gmünd, Germany "Designing for Sustainability: linking curiosity, creativity, and innovation" May 2015
9. Tokyo University of Science "Science, Communication, and Sustainable Futures: we need more than the best science and technology"
10. Extreme Events and Environments From Climate to Society (E3S) workshop, Berlin, Germany "Stakeholders and Collaboration in Global Change Research" March 2015
11. Future Earth webinar presentation "ArcticSTAR: Solution Oriented Transdisciplinary Research for a Sustainable Arctic" with V. Faye McNeill (Columbia University), February 2015

12. IASS Climate Engineering summer course "Engaging Stakeholders In Decision Making At Multiple Scales And Levels in the contested discourse on geo- and climate engineering" Potsdam Germany August 2014
13. International Sociological Association Annual Conference, "Socio-Ecological Risks and Governance of Resource Extraction in the Eurasian Arctic and Global Feedback Loops" with Kathrin Keil and J. David Tàbara, Yokohama, Japan July 2014
14. Potsdam Summer School on Sustainability: "The Arctic in the Anthropocene" Potsdam, Germany June, July 2014
15. Land Ocean Interactions In The Coastal Zone (LOICZ-Future Coasts) scientific steering committee meeting, "Enabling Societal Change Through Rigorous Science + Mutual Learning: Using rigorous science with stakeholder engagement to enable transformations toward a sustainable future" Hamburg, Germany May 2014
16. Alcatel-Lucent Foundation Masters course together with Professor Ortwin Renn on linking science communication with the challenges of finding pathways toward sustainable futures for all, University of Stuttgart, Germany May 2014
17. Climate Services Center annual conference at Potsdam Institute for Climate Research (PIK) "Enabling societal change through mutual learning processes" Potsdam, Germany February 2014
18. Habib University, Climate Change Conference, "Scientific Information, Narrative Visions, And Global Challenges In Local Contexts" Karachi, Pakistan January 2014
19. TERI University "Developing linked research and educational strategies for the Anthropocene Era" New Delhi, India January 2014
20. Berlin-Brandenburg Academy of Sciences and Humanities (BBAW) keynote address for high level workshop on Intercultural Comparison of the Understanding of Science and Technology in Selected Countries: "Strengthening Science, Technology, Engineering, and Math Education In Light of Global Challenges" Berlin, Germany December 2013
21. EPFL Center on Risk Analysis and Governance (CRAG) & International Risk Governance Council (IRGC) symposium, "Engaging The Public In Energy Issues: Design of a new exhibition on energy transition, smart grids, and sustainability" Lausanne, Switzerland November 2013
22. Santa Fe Institute & International Institute for Applied System Analysis (IIASA) workshop, "Narratives For Societal Transformation Toward Sustainability", Santa Fe, New Mexico October 2013
23. University of Zürich Global Change & Biodiversity retreat, "Thinking Across Boundaries: on transdisciplinary global change research" Switzerland September 2013
24. Caux Dialogue on Land and Security, Switzerland "On Land, Information, and Sustainable Provisioning of Humanity" Caux Switzerland July 2013
25. IASS/PIK Global Sustainability Summer School, "Stakeholders, Context, and Conflict" Potsdam, Germany July 2013
26. Japan Science & Technology Agency, Tokyo, "Knowledge Systems For Sustainability: Challenges In Providing Food For Humanity" May 2013
27. Tokyo University of Science, "Models, narratives, and social innovation for a more sustainable future" May 2013
28. Mote Marine Laboratory, Sarasota, FL research conference on Integrated Environmental and Local Knowledge for Sustainable Governance of the Commons (ILEK), "Reflections on ILEK Research Projects In The Context Of The Knowledge, Learning, and Societal Change (KLSC) Alliance" May 2013
29. Association of Polar Early Career Scientists workshop at Arctic Science Summit Week, Krakow, Poland "Inter-, multi-, and trans-disciplinary research in the Anthropocene era: Addressing complex systemic challenges in which we humans are inherently significant actors in the system" April 2013

30. Global System Dynamics and Policy Conference, Brussels. Narratives session co-organizer and presenter "The Role of Models And Narratives In Global Systems Science" November 2012
31. Berlin Conference on the Human Dimensions of Global Environmental Change, Berlin member of scientific advisory committee and chair of session on Co-Production of Knowledge October 2012
32. National Taiwan Normal University, Taipei Symposium on Climate Change and Sustainability Literacy keynote lecture "Finding Our Way Toward Future Earth: Issues, Methods, and Collaborations" September 2012
33. Research Institute For Humanity and Nature, Kyoto, Japan, workshop on Integrating Local and Environmental Knowledge Project (ILEK), keynote "Making Models, Telling Stories, And Changing Behaviors In The Context Of The ILEK Project" July 2012
34. International Council for Science (ICSU) and International Social Science Council (ISSC) workshop on Transdisciplinary Intercultural Ecological Research, Friedrich Schiller University, keynote address "Providing Options, Inspiring Actions: Models and Narratives For A Sustainable Future." June 2012
35. Center for Environmental Systems Research, University of Kassel, Germany "Providing Options, Inspiring Actions: Models and Narratives For A Sustainable Future" June 2012
36. Institute for Science, Innovation and Society, University of Oxford, Oxford, UK "Making models, telling stories, and changing behaviors toward a more sustainable future" May 2012
37. Tokyo University of Science, University lecture "Science, Innovation, and Society: Creating Pathways To A Sustainable Future." April 2012
38. Research Institute For Humanity and Nature, Kyoto, Japan kickoff symposium for new international transdisciplinary project, keynote lecture "Knowledge, Learning, and Societal Change: Finding Paths To A Sustainable Future For All" April 2012
39. Planet Under Pressure conference, London, organizer and chair of session on "Building Capacity For Sustainability By Learning To Model Nature and Society" March 2012
40. Planet Under Pressure conference, London, organizer and co-chair with Sander van der Leeuw of session on "Collective Action For The Transition To A Sustainable Society: Building The Research And Action Agenda" March 2012
41. Baltic Sea 2020 Foundation, Stockholm, "Formation, Operation, and Outcomes of the Polish Fisheries Roundtable" February 2012
42. US National Science Foundation and the Center for the Advancement for Informal Science Education symposium on Sustainability Science Education and Informal Science Education, Ballston Virginia, "Models and Narratives in Transitioning To A Sustainable Future For All" February 2012
43. International Hydrological Program Conference on Extreme Events, Kyoto University, keynote lecture on "Models And Heuristics: Learning To Cope With Risk And Complexity." October 2011
44. European Science Foundation and Centre for Social Innovation conference on humanities and social innovation, Challenge: Social Innovation, Vienna, Austria September 2011, "Once upon a future time: visions, models, and narratives to lead us to a sustainable future"
45. IIASA Risk, Policy & Vulnerability program, Laxenburg, Austria, September 2011, "Learning, risk, and sustainability"
46. Global System Dynamics and Policy workshop on Agent-Based Models, Paris, September 2011, "Learning to cope with complexity by understanding models of nature and society"
47. Chinese Meteorological Administration, Beijing, August 2011 "Learning science through inquiry and experience"

48. Dept of Applied IT, Chalmers University, Sweden and the Institute of Science, Qafqaz University, Azerbaijan (live video link), Masters Course on change management, May 2011: "Learning to cope with complexity in a rapidly changing world"
49. Swiss Global Change Day conference, Bern, Switzerland, April 2011: "Changing learning so we can learn to change society"
50. Center for Digital Systems (CeDiS), Freie Universitat Berlin: concluding conference on eKnowNet project funded by the European Commission under the Lifelong Learning Program, December 2010: "Who needs and who wants science literacy and why: lessons learned in USA, Europe, and Asia."
51. Swiss Re & Virginia Tech Univ. conference on "Community Resiliency, Integrated Risk, Response, and Recovery - Policy and Management: International Perspectives across Multiple Scales" Zürich, Switzerland October 2010: Speaker and panelist on Resilience Issues - integrating science and practice.
52. Kiel Institute for the World Economy, Kiel, Germany August 2010 "Seeking empirical methods and data for better modeling of social-ecological-economic systems"
53. International Society of Ecological Economics annual conference, Oldenburg, Germany, August 2010 "Analyzing perceptions of climate change risk: mental models and their formation"
54. Socially Coupled Systems and Informatics Workshop, Virginia Biotech Institute, Alexandria, VA July 2010 "Knowing, Learning, and Adapting: Understanding coupled social, ecological, and economic systems"
55. International Workshop on Sustainability and Social Learning, Stockholm Resilience Center, Stockholm, Sweden June 2010, "Knowing, Learning, and Changing in Transitioning to a Sustainable Future"
56. Chinese Institute for Science Popularization (CRISP) 17th annual conference on Public Communication of Science and Technology (PCST), Beijing May 2010, "PCST for Knowing, Learning, and Adapting"
57. Research Institute for Humanity and Nature (RIHN), Kyoto, Japan March 2010 – Symposium on environmental governance in China, "Linking Environmental Governance With Learning and Knowledge."
58. Disaster Prevention Research Institute, Kyoto University, Japan – Symposium on sustainability, resilience, and extreme weather conditions January 2010, "Knowledge, Understanding, and Risk"
59. Education for Sustainable Development in a River Basin Context, Swedish International Development Agency (SIDA) lecture held at Chalmers, November 2009: "Learning for a Sustainable Future: fishermen at sea and children at school"
60. Opening address, Alliance for Global Sustainability, ETH, Zürich, Switzerland, October 2009, "Catalyzing Adaptive Thinking: universities, communities, and global priorities."
61. University of Modena and Reggio Emilia, Italy, September 2009, "Pathways and Priorities: Connected pathways through life for learning, collaborating, and innovating."
62. J. Wang, J. Zhao, C. Stöhr, I. Chabay, paper presented at the IHDP Open Meeting, Bonn, Germany April 2009: "Growing Up To Be Migrant Workers? -- How Migrant Workers' Learning and Understanding of Science Affect Their Children's Education in China"
63. International Human Dimensions Program capacity building workshop, held at the Institute for Economic Development, University of Delhi, India, October 11-16, 2008, Professors Kanchan Chopra and Ilan Chabay, convenors: "From Research to Societal Action: The Case of Ecosystem Services"
64. Conference on L'Apprentissage des Sciences dans L'Europe de la Connaissance; for French Presidency of the EU, Grenoble, France, October, 2008: "Representing Sustainability Science in Informal Science Learning Environments"

65. First International Sociological Association (ISA) Forum, Barcelona, Spain, September, 2008: plenary lecture in session on collaboration between natural and social sciences: "Bellwethers, Beacons, and Behaviors"