

Akademien der Wissenschaften Schweiz Académies suisses des sciences Accademie svizzere delle scienze Academias svizras da las scienzas Swiss Academies of Arts and Sciences

td-net Network for Transdisciplinary Research

A Tour d'Horizon of Literature Related to Transdisciplinarity Published in 2013

The number of publications in the field of inter- and transdisciplinary research has been steadily growing during recent years (<u>http://www.transdisciplinarity.ch/e/Bibliography/</u><u>Publikationstrend_itd.php</u>).

In order to give an overview the td-net invites experts of transdisciplinary research every year to inform us about important recent publications in the area of transdisciplinarity (see list of contributors). In this document we present new literature published in 2013 with short annotations written by the experts that recommended the publications.

We would like to thank the contributors for their inputs and are looking forward to another productive year for transdisciplinary research.

«Tour d'horizon» literature lists from previous years can be found here <u>http://www.transdisciplinarity.ch/e/Bibliography/new.php</u>

More information about transdisciplinary literature is available from the «bibliography transdisciplinarity» at http://www.transdisciplinarity.ch/e/Bibliography/

New: The content is interacitve and the biographical data is hyperlinked with the matching website

Categories

General overviews	2	Uncertainty	6
Concepts of inter- and transdisciplinarity	2	Complexity	7
Mapping inter- and transdisciplinarity	3	Systems thinking	7
Team science	4	Intervention research	7
Project management	4	Sustainability science	7
Evaluation of inter- and transdisciplinary research	4	Technology assessment	8
Institutions for transdisciplinary research	5	Anthropocene	8
Education for inter- and transdisciplinary research	5	Social ecology	8
Problem orientation	6	Life sciences	9
Science-policy interface	6	Urban studies	10
Thought styles	6	Contributors	10
Participation	6		

General overviews

Bammer G 2013. *Disciplining Interdisciplinarity. Integration and Implementation Sciences for Researching Complex Real-World Problems*. Canberra: ANU E-Press.

«This book describes a framework for a storehouse of concepts, methods and case studies for undertaking transdisciplinary and related research (interdisciplinary, post-normal science, systemic intervention, integrated assessment, sustainability science, team science, mode 2, project management and action research). Somewhat controversially it argues for the establishment of a new methods-based discipline of Integration and Implementation Sciences (I2S). A highlight of the book is the 24 commentaries which start a discussion about this proposal.» (gb)

«The magnum opus of Gabriele Bammer comprehensively introduces readers to thinking and practicing Integration and Implementation Sciences. It is stimulating also because Bammer thinks big: "It is 2025. Professor Srilatha Singh at the National University of India is chairing a video-conference of the directors of 20 departments of Integration and Implementation Sciences around the world, p199". Furthermore it is a piece of dialogue including 24 commentaries/reactions to the draft of the book from colleagues around the world.» (cp)

Newell W H 2013. *The state of the field: Interdisciplinary theory*. Issues in Interdisciplinary Studies, V31, pp 22-43.

Szostak R 2013. *The state of the field: Interdisciplinary research*. Issues in Interdisciplinary Studies, V31, pp 44-65.

Klein J T 2013. *The state of the field: Institutionalization of interdisciplinarity*. Issues in Interdisciplinary Studies, V31, pp 66-74.

All three articles available at:

http://www.units.miamioh.edu/aisorg/HomePage/Newell%20Szostak%20Klein%20SOF%202013.pdf

«These articles each provide a survey of the literature and suggest avenues for further research. They in turn address theories of the nature of interdisciplinarity, how to perform interdisciplinary research, and how interdisciplinarity is and should be institutionalized.» (rs)

The new "About Interdisciplinarity» section of the website of the Association for Interdisciplinary Studies

«The site is accessible from the AIS home page (<u>http://www.units.muohio.edu/aisorg/</u>) via a button in the vertical menu bar on the left side of the page. It's a work in progress, which we hope to use as a way to draw non-members as well as members who don't attend AIS conferences into discussion of a wide range of issues related to interdisciplinarity.» (wn)

» back to content

Concepts of inter- and transdisciplinarity

Barry A, Born G (eds) 2013. *Interdisciplinarity. Reconfigurations of the Social and Natural Sciences*. Abingdon, Oxon: Routledge.

«An approach to theorising interdisciplinarity, showing how the boundaries between the social and natural sciences are being reconfigured. A promotion of collaboration between the natural sciences and engineering and the social sciences, arts and humanities.» (fd)

Frodeman R 2013. *Sustainable Knowledge. A Theory of Interdisciplinarity*. Hampshire: Palgrave Pivot.

«An investigation of the future of the university through questioning the notion of disciplinarity and the challenge of interdisciplinarity in a sustainable perspective.» (fd)

Holbrook J B 2013. What is interdisciplinary communication? Reflections on the very idea of disciplinary integration. Synthese, V190, N11, pp 1865-1879.

«The article argues that thinking of interdisciplinarity in terms of 'integration' is not necessarily the only – or necessarily the best – way to think of inter- or transdisciplinary communication.» (bh)

Hoffmann M, Schmidt J, Nersessian N (eds) 2013. *Philosophy of and as interdisciplinarity* <u>Special Issue</u>. Synthese, V190, N11.

«Synthese is a well-respected journal within philosophy of science.» (bh)

Nicolescu B, Ertas A (eds) 2013. *Transdisciplinary: Theory and Practice*. Lubbock, Texas, USA: ATLAS Publishing.

"This book contains eleven papers. A wide variety of issues related to transdisciplinarity such as education, complexity, theology, mechatronics and transdisciplinary learning are covered.» (bn)

» back to content

Mapping inter- and transdisciplinarity

Montuori A 2013. *The complexity of transdisciplinary literature reviews*. Complicity: An International Journal of Complexity and Education, V10, N1/2, pp 45-55.

«The transdisciplinary literature review is an opportunity to situate the inquirer in an ecology of ideas. This article explores how we might approach this process from a perspective of complexity, and addresses some of the key challenges and opportunities. Four main dimensions are considered: (a) inquiry-based rather than discipline-based; (b) integrating rather than eliminating the inquirer from the inquiry; (c) meta-paradigmatic rather than intra-paradigmatic; and (d) applying systems and complex thought rather than reductive/disjunctive thinking.» (ma)

Uzzi B, Mukherjee S, Stringer M, Jones B 2013. *Atypical combinations and scientific impact*. Science, V342, N6157, pp 468-472.

«In their article the authors employed the Web of Science database spanning multiple fields to reveal features of scientific collaborations that are most closely linked to the creativity and impact of scholarly products such as published research reports. They found that the highest-impact science is largely grounded in conventional combinations of prior work but also features the incorporation of unprecedented combinations of previously disparate ideas and information. Moreover, they observed that teams are 38% more likely than solo authors to insert novel combinations into familiar knowledge domains.» (ds)

Williams C J, O'rourke M, Eigenbrode S D, O'loughlin I, Crowley S J 2013. *Using bibliometrics to support the facilitation of cross-disciplinary communication*. Journal of the American Society for Information Science and Technology, V64, N9, pp 1768-1779.

«Given the importance of cross-disciplinary research (CDR), facilitating CDR effectiveness is a priority for many institutions and funding agencies. The authors present a method, based on bibliometric techniques and citation data, for characterizing a spectrum of CDR designed to inform facilitation efforts. Especially useful is the use of this approach to identify the location of collaborative CDR teams on a map of scientific activity for research administrators, research teams, and other efforts to enhance CDR projects.» (hf)

Team science

Armstrong A, Jackson-Smith D 2013. *Forms and levels of integration: Evaluation of an interdisciplinary team-building project*. Journal of Research Practice, V9, N1, Article M1. «This article takes a close look at team science models, which are advocated as a way to study complex societal and environmental problems. It evaluates specific team-building and grant-writing activities, looking for the emergence of integrative capacity at the individual, group, and institutional levels. Findings highlight the importance of social integration as a basis for conceptual integration and an ability to relate these concepts to real-world problems.» (dd)

Vogel A L, Hall K L, Fiore S M, Klein J T, Michelle Bennett L, Gadlin H, Stokols D, Nebeling L C, Wuchty S, Patrick K, Spotts E L, Pohl C, Riley W T, Falk-Krzesinski H J 2013. *The Team Science Toolkit: Enhancing research collaboration through online knowledge sharing*. American Journal of Preventive Medicine, V45, N6, pp 787-789.

«The National Cancer Institute's (NCI) SciTS Team developed the Team Science Toolkit (<u>www.</u> <u>teamsciencetoolkit.cancer.gov</u>) as an online knowledge management system that collects and integrates team science and interdisciplinary research knowledge and resources and makes them readily accessible to researchers, practitioners, and leaders.» (hf)

«This article describes the development and structure of the NIH-National Cancer Institute Team Science Toolkit. The Toolkit is a dynamic online "one-stop-shop» that consolidates and provides easy access to knowledge, practical tools, and strategies for TS. The Toolkit addresses key barriers to advancing TS and the SciTS field that result from the challenges of knowledge dissemination among a diverse and dispersed set of stakeholders.» (ds)

Watkins M 2013. *Making virtual teams work: Ten basic principles*. Harvard Business Review Blog: <u>http://blogs.hbr.org/2013/06/making-virtual-teams-work-ten/</u>

«This article presents practically useful principles for enhancing the effectiveness of virtual teams, which are very often multidisciplinary and interdisciplinary, although this article does not address requirements for ID/TD in depth. Written from a business sector perspective, this article may be helpful for virtual teams that span university, industry, local community, and government stakeholder groups.» (ds)

» back to content

Project management

König B, Diehl K, Tscherning K, Helming K 2013. *A framework for structuring interdisciplinary research management*. Research Policy, V42, N1, pp 261-272.

«While research is increasingly being organised into temporary limited and externally funded projects this framework allows for planning, monitoring, evaluation and scientific discussion. Excellent reflection from the "how-to" perspective.» (hw)

» back to content

Evaluation of inter- and transdisciplinary research

Bornmann L 2013. *What is societal impact of research and how can it be assessed? a literature survey*. Journal of the American Society for Information Science and Technology, V64, N2, pp 217-233.

«There is a growing literature on finding ways to assess the broader societal impact of research, and Bornman's essay does a good job of reviewing that literature. It's an excellent source for those interested in finding out more about the state of the art in impact assessment – something that's important for all research, but especially so for interdisciplinary and transdisciplinary research.» (bh)

Paruolo P, Saisana M, Saltelli A 2013. *Ratings and rankings: voodoo or science?* Journal of the Royal Statistical Society: Series A (Statistics in Society), V176, N3, pp 609-634.

«Composite indicators aggregate a set of variables by using weights which are understood to reflect the variables' importance in the index. Six composite indicators, including the human development index and two popular league tables of university performance are analysed. It is found that in many cases the declared importance of single indicators and their main effect are very different, and that the data correlation structure often prevents developers from obtaining the stated importance.» (js)

Saltelli A, Pereira Â, van der Sluijs J P, Funtowicz S 2013. *What do I make of your Latinorum? Sensitivity auditing of mathematical modelling*. International Journal of Foresight and Innovation Policy, V9, N2/3/4, pp 213 - 234.

«If one accepts that policy–related science calls for an extension of the traditional internal, peer review–based methods of quality assurance to higher levels of supervision, where extended participation and explicit value judgments are necessary, then by the same token sensitivity analysis must extend beyond the technical exploration of the space of uncertain assumptions when the inference being sought via mathematical modelling is subject to relevant uncertainties and stakes. To this end this paper presents seven rules to extend the use of sensitivity analysis (or how to apportion uncertainty in model–based inference among input factors) in a process of sensitivity auditing of models used in a policy context.» (js)

» back to content

Institutions for transdisciplinary research

Ravid K, Faux R, Corkey B, Coleman D 2013. *Building interdisciplinary biomedical research using novel collaboratives*. Academic Medicine, V88, N2, pp 179-184.

«Traditionally, biomedical research has been carried out mainly within departmental boundaries. However, successful biomedical research increasingly relies on development of methods and concepts crossing these boundaries, requiring expertise in different disciplines. The authors describe a novel approach to the organization of biomedical research, interdisciplinary research groups termed affinity research collaboratives (ARCs). Each ARC consists of investigators from several academic departments and at least two research disciplines, bound by a common goal to investigate biomedical problems concerning human disease. ARCs are offered as a productive model for leveraging discovery.» (hf)

» back to content

Education for inter- and transdisciplinary research

Muhar A, Visser J, Van Breda J 2013. *Experiences from establishing structured inter- and transdisciplinary doctoral programs in sustainability: a comparison of two cases in South Africa and Austria*. Journal of Cleaner Production, V61, N0, pp 122-129.

«In this article the authors share their learning experiences of designing and implementing structured inter- and transdisciplinary doctoral programs in sustainability in two different geographical and cultural contexts. The aim of the article is to invite critical reflection and discussion, as well as to stimulate related developments elsewhere.» (jv)

Ulrich W, Dash D P 2013. *Research skills for the future: Summary and critique of a comparative study in eight countries.* Journal of Research Practice, V9, N1, Article V1.

«This article reviews a previous study of research skills across industry sectors. It invites discussion on the skills and competencies that ought to be developed for the new research-based careers arising in various sectors. Such a discussion is important because, currently, the views of research managers and directors appear to overshadow the genuine voice of researchers.» (dd)

Problem orientation

Weiland S, Weiss V, Turnpenny J (eds) 2013. *Nature, science, and politics, or: Policy assessment to promote sustainable development* <u>Special Issue</u>. Nature + Culture, V8, N1. «This issue of the journal *Nature* + *Culture* developed out of the transdisciplinary network LIAISE (Linking Impact Assessment Instruments to Sustainability Expertise), a so-called Network of Excellence of the EU in which the three guest editors of the issue have been involved. By focusing on the role of impact assessment of planned policies, this special issue aimed at departing from a one-way flow of knowledge from science to policy by raising crucial question of inter- and transdisciplinarity and focusing on how science and politics can fruitfully cooperate in practice. The contributions include debates on the science-politics of climate change, conflicts on old-growth forest to the question of the involvement of different publics in real world experimental strategies around chemical regulations.» (mg)

» back to content

Science-policy interface

Neßhöver C, Timaeus J, Wittmer H, Krieg A, Geamana N, Van Den Hove S, Young J, Watt A 2013. *Improving the science-policy interface of biodiversity research projects*. GAIA - Ecological Perspectives for Science and Society, V22, N2, pp 99-103.

«Against the background of a continuing biodiversity loss there is a strong need to improve the interfaces between science and policy. Many approaches for such interfaces exist, the most recent being the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). A less prominent approach to interface science with policy consists of research projects directly linking with decision makers. The article presents insights and recommendations on how to do this successfully, highlighting among others the role of facilitating mutual learning and enhancing interface expertise in institutions.» (tm)

» back to content

Thought styles

Couix N, Hazard L 2013. When the future of biodiversity depends on researchers' and stakeholders' thought-styles. Futures, V53, N0, pp 13-21.

«The paper critically reviews how a group of biologist collaborate in an ecological restoration project. The biologists could not agree on plant species to be used for restoration. As each of the biologists had another biological thought-style – looking trough Linnéean, Darwinian or restoration management 'glasses' – they identified other plant species as adequate.» (cp)

» back to content

Participation

Aichholzer G, Cimander R, Kubicek H 2013. *Can information save energy? A three country comparison of words and actions in participatory local climate protection projects.* International Journal of Electronic Governance, V6, N1, pp 66-85.

«The publication is based on a collaboration between three research teams with an interdisciplinary composition (applied computer science, policy science, sociology, administrative management). Based on an international comparative and empirical research project with an innovative research approach and interdisciplinary combination of methods (CO₂ budgets, citizen surveys, panel discussions, telephone interviews), new findings about citizen participation in local climate protection initiatives and e-participation for the achievement of climate goals are presented.» (mn)

» back to content

Uncertainty

Udovyk O, Gilek M 2013. Coping with uncertainties in science-based advice informing environmental management of the Baltic Sea. Environmental Science & Policy, V29, N0, pp 12-23.

Complexity

Alhadeff-Jones M 2013. *Method and complexity in educational sciences* <u>Special Issue</u>. Complicity: An International Journal of Complexity and Education, V10, N1/2.

«This is a collection of articles by different authors. Together they address key challenges regarding the relationship between 'method' and 'complexity'. As stated in the editorial introduction: "They should feed our imagination, our curiosity, and our desire to nurture new ways of knowing. They should stimulate critical experiences and daring experimentations in our 'pursuit of knowledge'» (jv)

Alhadeff-Jones M 2013. *Complexity, methodology and method: Crafting a critical process of research*. Complicity: An International Journal of Complexity and Education, V10, N1/2, pp 19-44.

«Inspired by Morin's paradigm of complexity, Le Moigne's « general system theory » and Alhadeff-Jones' work on critique and complexity, the theoretical framework developed in this paper suggests one to conceive the orders and disorders of transdisciplinary research according to a method revolving around 'programmatic' and 'strategic' modalities of research. This paper defines a 'system of representations' aiming to locate and support the actions and reflections of researchers in order to critically conceive the complexity of a scientific process of research. The approach is based on three 'moments', which represent recurring stages of the spiralling development of research.» (ma)

» back to content

Systems thinking

Hieronymi A 2013. *Understanding systems science: a visual and integrative approach*. Systems Research and Behavioral Science, V30, N5, pp 580-595.

«This article presents an overview of systems thinking. It argues the relevance of systemic principles and systemic design for improving practice in various application domains. The article is written for a broad audience and it is easy to follow. It could serve as an initial reading in systems thinking for professional development.» (dd)

» back to content

Intervention research

Lerchster R, Krainer L 2013. *Out of the ivory tower, and into reality*. Challenging Organisations and Society, V2, N1, pp 274-288.

«The article offers an introduction in paradigms and methods of intervention research, a transdisciplinary method of research that has been developed at the university of Klagenfurt.» (lkr)

» back to content

Sustainability science

Bearth T 2013. «Language and sustainability». In Beck R M (ed). *Language and Development*, (Frankfurter Afrikanistische Blätter 20), pp 15-61. Köln: Rüdiger Köppe.

«Claims a theoretical status for communicative sustainability in the classic trefle of "sustainabilities», a claim supported by a detailed study integrating local economic argumentation in a West African case of environmental preservation.» (tb)

Brandt P, Ernst A, Gralla F, Luederitz C, Lang D J, Newig J, Reinert F, Abson D J, Von Wehrden H 2013. *A review of transdisciplinary research in sustainability science*. Ecological Economics, V92, pp 1-15.

«I liked how they quantified the use of TD frameworks in the projects themselves (for instance how measured the 'participation' from non-scientists aspect so called: "intensity of involvement of practitioners»). What it shows is that although we have a long way to go to integrate TD with sustainability, existing TD tools can be used to asses case studies in sustainability science. Most importantly, the author's TD analysis itself provides a model for self-reflection on the field as a whole and comes up with some concrete recommendations.» (dk) Romaine S 2013. *Keeping the promise of the Millennium Development Goals: Why language matters*. Applied Linguistics Review, V4, N1, pp 1-21.

«A passionate and well informed plea from one of the world's leading sociolinguists for recognition of language in its diversity as a key issue and as a key resource in the new paradigm of Sustainable Development Goals currently being elaborated as a follow-to the United Nations' Millennium Development Goals (MDG).» (tb)

» back to content

Technology assessment

Gorman H S 2013. *Learning from 100 years of ammonia synthesis. Establishing humandefined limits through adaptive systems of governance*. GAIA - Ecological Perspectives for Science and Society, V22, N4, pp 263-270.

«The technological innovation of fixing nitrogen industrially pushed societies into new ecological territory: human activity and choices are now a significant component of the biogeochemical cycling of nitrogen, and the regulatory role of bacteria has been diminished. The article points out that societies are adapting – albeit gradually – to their new role by learning to establish human-defined limits through adaptive forms of governance. " (tm)

» back to content

Anthropocene

Hobbs R J, Higgs E S, Hall C (eds) 2013. *Novel Ecosystems: Intervening in the New Ecological World Order*. Chichester: Wiley-Blackwell.

«Ecologists and conservations are in a phase of intensive deliberations about new approaches for managing emerging novel ecosystems that are strongly shaped by humans. This edited book represents the state-of-the-art by bringing together contributions from ecologists, social scientists, humanists, and practitioners with experiences from novel ecosystems from around the world.» (ck)

Kueffer C 2013. «Integrating natural and social sciences for understanding and managing plant invasions». In Larrue S (ed). *Biodiversity and Societies in the Pacific Islands*. Presses Universitaires de Provence, Collection «Confluent des Sciences» & ANU ePress, pp 71-96.

«Research on biological invasions has been a problem-oriented research field in the environmental sciences for over 50 years. This article is a comprehensive review of interdisciplinary research among ecologists and social scientists in invasive species research. It discusses how such collaborations help to better understand the causes of invasions (system knowledge), elucidate the values and conflicts of interests associated with invasions (target knowledge) and develop more effective and robust solutions (transformation knowledge).» (ck)

» back to content

Social ecology

Lejano R P, Stokols D 2013. *Social ecology, sustainability, and economics*. Ecological Economics, V89, N0, pp 1-6.

«A short article on the core ideas of social ecological thinking. A central assumption of social ecology is that social/semiotic and material/ecologic dimensions of an issue are interlinked with each other but can't be transformed into each other. Hence, without combining natural and social science/ humanities perspectives, issues will necessarily only partially be understood.» (cp)

Life sciences

Fitzgerald D, Brunner E, Koellinger P, Navarro A 2013. *"The Good, the Bad and the Ugly» – Understanding Collaboration between the Social Sciences and the Life Sciences*. Strategic Workshop Report. Standing Committee for the Social Sciences (SCSS), European Science Foundation, Strasbourg.

«Some of the most challenging and urgent scientific and social questions that face us in the twentyfirst century seem to require that researchers in the life sciences, the social sciences and indeed the human sciences break out of their disciplinary silos and engage in inter- and transdisciplinary research. The report highlights motivations, obstacles, pitfalls and rewards of existing and novel forms of engagement between the life sciences and the social sciences as well as the need for some pragmatic forms of institutional support if experiments in interdisciplinarity are to flourish. The report concludes with a number of practical recommendations, addressed to researchers, research administrators, funders and policy-makers, which would help enable and improve collaboration between social scientists and life scientists in the interest of reaching a deeper understanding of human and social phenomena.» (pp)

Grebenshchikova E G, Kiyashchenko L P 2013. *How is it possible rethinking of human in molecular age?* Working papers on bioethics, I17. Human being – NBIC machine, Tishchenko P (ed). Moscow: Moscow University for Humanities Press, pp 55-66 (in Russian).

«The paper presents the methodology opportunities of transdisciplinary approach to analyze changes in modern science, and molecular sciences in particular. Special attention is paid to the relationship between science and society, which concern the need of translation the latest achievements of the science into the language of society, establishing communication channels to broadcast biomedical innovation, creation of conditions for adequate public acceptance of new possibilities of science.» (lk)

Tishchenko P D 2013. *Typology of innovative models and transdisciplinary context*. Working papers on bioethics, I16. Human being – NBIC machine, Tishchenko P (ed). Moscow: Moscow University for Humanities Press, pp 55-66 (in Russian).

«Specificity of the author's approach lies in the fact that his proposed typology of innovation models is correlated with historical stages of formation of relationships between the state, science and business in Russia. He, also offers critique of innovative transhumanist program of strategic social movement «Russia 2045».» (Ik)

Yudin B 2013. *Technological forms of functioning of the social and humanitarian knowledge in the contemporary society*. Working papers on bioethics, I17. Human being – NBIC machine, Tishchenko P (ed). Moscow: Moscow University for Humanities Press, pp 90-102 (in Russian).

«The author describes different forms of existence and functioning of the social and humanitarian knowledge. Traditionally such type of knowledge was expressed in form of the research articles, textbooks etc. Nowadays social and humanitarian knowledge gets its expression not just in these customary forms, but in form of various technologies as well. These technologies plays crucial role in functioning of the technoscience. They provide necessary means for "socialization» of emerging technologies, for assimilation of technological innovations by society.» (lk)

Urban studies

König A (ed) 2013. *Regenerative Sustainable Development of Universities and Cities. The Role of Living Laboratories*. Cheltenham UK: Edward Elgar Publishing.

«Ariane König has collected a fine set of transdisciplinary case studies for sustainable urban development from North America, Europe, and Asia. By showing how university campuses and urban districts can be conceptualized as living laboratories that include scientists and stakeholders alike the authors of this volume are able to demonstrate the fruitfulness of such experimental strategies that are able to improve environmental quality and human well-being.» (mg)

Lachmund J 2013. *Greening Berlin. The Co-Production of Science, Politics, and Urban Nature*. Cambridge MA: MIT Press.

«This engaging book illustrates the tight interaction between scientists, concerned stakeholders, and different political institutions in the development of degraded industrial or brownfield sites in and around the city of Berlin. Lachmund can show how the emergence of ever new ecological patterns came about by reshaping crucial elements of ecology as a science and restless attempts to integrate urban nature into the world of urban settlers.» (mg)

» back to content

Contributors

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