

Mathematician, Cognitive-Neuro-Scientist, Educational Researcher, Mother and Wife

Grumbrechtstraße 25, 21075 Hamburg, Germany

INTERESTS**fields:** mathematics; neuroscience; cognitive science; educational science**concepts:** embodied cognition; holistic, collaborative design; design-based research**contents:** cognitive development; autonomous behavior; community of practice; instructional design;**methods:** dynamical neural fields; stochastic dynamic systems; Bayesian analysis; autonomous robotics; experimental design; ways of thinking and practising (WTP); constructive alignment; eduScrum; design-a-thon**applications:** teaching and learning environments; active, situated learning; participative/empowering education; media and technology for interdisciplinary collaboration; goal-alignment in project management; retaining and employing institutional knowledge; public outreachPROFESSIONAL EXPERIENCES

01/2020–12/2021	Postdoc on Educational Research, Robotics Group	Bremen
	Computer Science & Electrical Engineering, Jacobs-University Bremen (JU-B)	
research topic	<ul style="list-style-type: none"> • educational robotics: realization of the Robotics and Intelligent Systems (RIS) program • establishing congruence/constructive alignment between the program's Specific Aims and courses' Intended Learning Outcomes (ILOs) with teaching practice and examination • co-developing, co-implementing and evaluating teaching and learning environments • enhancing student collaboration and active learning 	
CoP initiative	<ul style="list-style-type: none"> • co-established a Community of Practice (CoP) among the members of the Building Beyond Boundaries (B3) research program • work on providing infrastructure for Scholarship of Teaching and Learning (SoTL) • co-authored one journal article and three conference papers 	
prof. training	acquired Definition-of-Ready certificate in eduScrum on agile methods for education and joined the intentional eduScrum CoP	
11/2017–10/2019	Scientist at the Mathematical Institute	Düsseldorf
	Heinrich-Heine-University (HHU)	
coordinator	<p>„Finanz- und Versicherungsmathematik“ (en. “Financial and Actuarial Mathematics”)</p> <ul style="list-style-type: none"> • assisted with the accreditation of the then newly established degree program • managed the program presentation and information in the web and video and print media • organized networking and professional colloquia for the students to exchange peer-to-peer, with faculty, and, respectively, business representatives • kept the Module Handbook updated in collaboration with faculty and teaching stuff • was active member of the program's Examination Regulations board 	
teaching	lead exercises, assisted faculty with examinations, and held office hours for courses in analysis I-II; stochastics; financial and insurance mathematics	
outreach	co-organized a “Girls Day” presenting female role models to introduce the study program and career perspectives of being a mathematician to high school students	

- prof. development completed 2/3 of an extensive 3-year certification program in higher education didactics (accomplishing “Activating teaching with method(s)”, “Constructive Alignment of Teaching, Learning, and Examination”, “Intervision: Peer Case Counseling” among others)
- 03/2017–08/2017 **Professional Training** Oracle Database and Web-Forms Hamburg
Oracle PL/SQL Developer Certified Associate [13/06/2017]
- 04/2016–10/2017 **Studies and Activities** Germany or USA
- presented teaching concepts and research projects
 - published in and reviewed for scientific journals
 - participated in a “Quantum Computing” seminar Center for Applied Cybersecurity Research, Indiana University
- 04/2012–03/2016 **Scientist at the Institute of Air Transportation Systems** Hamburg
German Aerospace Center—Deutsches Zentrum für Luft- und Raumfahrt (DLR)
- research topic The use of communication technology and project governance to foster collaboration in locally distributed and agile projects in trans-disciplinary engineering.
- methods
- designed experiments and surveys to investigate collaborative work processes
 - developed interactive tools to examine the role of visualizations
 - disseminated results in journals and at conferences
- applications
- informed improvements and usage of the Integrated Design Lab at DLR
 - organized workshop and maintained a wiki on “Visualization of Big Data”
 - guided student projects and developed activity- and project-based courses
- collaborations
- Knowledge and Project Management departments at DLR
 - Teaching and Learning Center at the Technical University Hamburg (TUHH)
- 05/2011–01/2012 **Scientist at the Institute for Neural Computation** Bochum
Institut für Neuroinformatik Ruhr-University Bochum
- 12/2007–05/2011 **Postdoc at the Department of Psychology** Iowa City, Iowa
University of Iowa
- research topic Transfer insights about infant learning mechanisms to adult learning.
- methods
- derived novel hypotheses by exploring parametric dependencies in models
 - designed cognitive experiments that test above predictions
 - developed software for data collection and analysis
 - selected an appropriate model and extended it to account for adult learning
- robotics
- implemented computational models with robots (proof of concept)
 - demonstrated the real-time connection of perception, action, and cognition
- dissemination
- organized an interdisciplinary symposium on learning
 - taught multidisciplinary workshops about mathematical modeling
 - supervised students and conducted a lecture
 - conceptualized innovative learning projects for children to learn neurosciences
 - communicated results in journals and at conferences

07/2005–12/2007	Postdoc at the Department of Psychological and Brain Sciences Indiana University	Bloomington, Indiana
research topic	Embodied cognition account for infants' decision-making and learning processes.	
methods	<ul style="list-style-type: none"> • conceptualized and implemented a neural model of infant cognition • conducted predictive analysis to explore critical model parameters • designed, conducted, and analyzed experiments to test model predictions 	
robotics	<ul style="list-style-type: none"> • conducted a feasibility study by implementing the model on a robot • simulated infant decision-making in real-time by linking pattern recognition and neuronal representations at various time-scales with autonomous behavior 	
dissemination	<ul style="list-style-type: none"> • communicated results in journals, educational textbooks, and at conferences • supervised undergraduate students and assisted in supervising Ph.D. students 	

HIGHER EDUCATION

10/2019–	pursuing extra-occupational Master Higher Education	Hamburg
professional development	Hamburger Zentrum für Universitäres Lehren und Lernen University of Hamburg (UHH)	
10/2001–07/2005	Ph.D. in Neuroscience (2005) International Graduate School Neuroscience (IGSN) Ruhr-University-Bochum (RUB)	Bochum
dissertation	“Dynamical field theory of infant reaching and its dependence on behavioral history and context.” <ul style="list-style-type: none"> • extracted descriptive factors from disparate empirical data sources • designed a neurally and cognitively realistic process model 	
advisers	Prof. Dr. Gregor Schöner, Institut für Neuroinformatik, RUB Dr. Esther Thelen († 2004), Professor of Psychological & Brain Sciences, Indiana University, Bloomington, Indiana	
graduate school	<ul style="list-style-type: none"> • majored in neural computation: neuronal dynamics; information processing in self-organized systems (i.e., machine learning, evolutionary algorithms) • learned the basics in diverse neuroscience disciplines, including biology, medicine, psychology, and computer science • gained experience as an intern in four neuroscience laboratories 	
teaching	<ul style="list-style-type: none"> • supervised internships in neural computation with a focus on robotics • developed teaching material on behavioral dynamics and computer vision 	
10/1992–12/2000	Mathematics Diploma (2000) Mathematics Department, University of Hamburg	Hamburg
11/1997–	Undergraduate assistant at the Department of Psychology	Hamburg
11/2000	University of the German Armed Forces, now Helmut Schmidt University	
part-time	<ul style="list-style-type: none"> • tested software for its use for experimental design and conducted experiments • tutored experimental psychology: design and analysis of multivariate experiments 	

09/1995– **University of Edinburgh**
 06/1996 mathematics, mathematical education, and chemistry
 guest student

Edinburgh, UK

PUBLICATIONS

- Dineva, E., Faubel, C. & von Roth, K. (2021), iCanRobots—Active, Holistic, and Inclusive STEAM Education that Empowers Communities. Proceedings of the Fab 16 Research Papers Stream in Session Learning and Innovation. doi: 10.5281/zenodo.5169832*
- Birk, A. and Dineva, E. (2021), Improved Students' Performance in an Online Robotics Class during COVID-19: Do Only Strong Students Profit? Robotics in Education in Springer-Series: Advances in Intelligent Systems and Computing. doi: 10.1007/978-3-030-82544-7_13*
- Maurelli, F. Dineva, E., Nabor, A. & Birk, A. (2021), Robotics and Intelligent Systems: A new curriculum development and adaptations needed in coronavirus times. Robotics in Education in Springer-Series: Advances in Intelligent Systems and Computing. doi: 10.1007/978-3-030-82544-7_9*
- Birk, A., Dineva, E., Maurelli, F. & Nabor, A. (2021), A robotics course during COVID-19: Lessons learned and best practices for online teaching beyond the pandemic. Robotics 10(1) doi: 10.3390/robotics10010005*
- Dineva, E. & Schöner, G. (2018). How infants' reaches reveal principles of sensorimotor decision making. Connection Science 30(1), pp 53–80. doi: 10.1080/09540091.2017.1405382*
- Dineva, E., Bachmann, A., Knodt, U. & Nagel, B. (2016). Lessons learned in participative multidisciplinary design optimization. Journal of Aerospace Operations, 4(1–2), pp 49–66. IOS Press: Concurrent Engineering. doi: 10.3233/AOP-150054*
- Schöner, G., Faubel, C., & Dineva, E., Bicho, E. (2016). Embodied neural dynamics. In J. P. Spencer & G. Schöner (Eds.), Dynamic thinking: A primer on dynamic field theory (pp. 95–118). New York, NY, USA: Oxford University Press*
- Knodt, U., Dineva, E., & Nagel, B. (2015). The expert is leaving—The knowledge is lost? DLR's knowledge management solutions for the leaving expert issue. In Space—the gateway for mankind's future. Proceedings of the 66th International Astronautical Congress, IAC 2015. (IAC-15-D5.2.5)*
- Dineva, E., Zill, T. Knodt, U., & Nagel, B. (2015). Four Practical Lessons Learned from Multi-Disciplinary Projects. In R. Carrant et al. (Eds.) Transdisciplinary Lifecycle Analysis of Systems, Vol. 2. Advances in Transdisciplinary Engineering, IOS Press, pp. 439–448. doi: 10.3233/978-1-61499-544-9-439*
- Maruyama, S., Dineva, E., Spencer, J. P. & Schöner, G. (2014). The co-development of action planning and imitation: Perseverative action in an imitative context. Japanese Psychological Research, 56(4) pp. 358–401. doi: 10.1111/jpr.12065*
- Dineva, E., Bachmann, A., Moerland, E., Nagel, B., & Gollnick, V. (2014). New methodology to explore the role of visualization in aircraft design tasks: An empirical study. Int. J. of Agile Systems and Management, 7(3/4) pp. 220–241. doi: 10.1504/IJASM.2014.065356*
- Dineva, E., Bachmann, A., Knodt, U. & Nagel, B. (2014). Human Expertise as the Critical Challenge in Participative Multidisciplinary Design Optimization. In J. Cha et al. (Eds.) Moving Integrated Product Development to Service Clouds in the Global Economy. Vol. 2. Advances in Transdisciplinary Engineering, IOS Press, pp. 223–232. doi: 10.3233/978-1-61499-440-4-223*
- Dineva, E., Bachmann, A., Moerland, E., Nagel, B., & Gollnick, V. (2013). Empirical Performance Evaluation in Collaborative Aircraft Design Tasks. In C. Bil, J. Mo & J. Stjepandić (Eds.), 20th ISPE International Conference on Concurrent Engineering, pp. 110–118. doi: 10.3233/978-1-61499-302-5-110*

- Clearfield, M. W., Dineva, E., Smith, L. B., Diedrich, F. J., & Thelen, E. (2009). Cue salience in infant perseverative reaching: Tests of the dynamic field theory. *Developmental Science*, 12(1), 26–40.
doi: 10.1111/j.1467-7687.2008.00769.x
- Spencer, J. P., Dineva, E., & Schöner, G. (2009). Moving toward a grand theory while valuing the importance of the initial conditions. In J. P. Spencer, M. S. Thomas, & J. L. McClelland (Eds.), *Toward a new grand theory of development? Connectionism and dynamic systems theory re-considered* (pp. 285–298). New York: Oxford University Press
- Spencer, J. P., Dineva, E., & Smith, L. B. (2009). Comment on “Infants’ perseverative search errors are induced by pragmatic misinterpretation”. *Science*, 325(5948), 1624.
doi: 10.1126/science.1172759
- Schöner, G., & Dineva, E. (2007). Dynamic instabilities as mechanisms for emergence. *Developmental Science*, 10(1), 69–74. doi: 10.1111/j.1467-7687.2007.00566.x
- Dineva, E. (2005). *Dynamical field theory of infant reaching and its dependence on behavioral history and context*. Electronically published dissertation, Institut für Neuroinformatik & International Graduate School for Neuroscience, Ruhr-Universität-Bochum, Deutschland.

TEACHING

Nachhaltigkeit und Kunststoffrecycling (February 2020–January 2021) developed and lead a 6-unit educational program about Sustainability and Plastics Recycling in collaboration with Precious Plastic Hamburg (PPHH), Hamburg’s municipal facility (Stadtreinigung Hamburg, SRH), and a local school (Geschwister-Scholl-Schuhle, GSSG):

- designed a teaching and learning environment and curriculum, revealing linear and circular economies
- managed design and production of PPHH plastic recycling machines, suitable for operation by children (downsized, improved manual operation, safety-checked, with approved instructions)
- developed and implemented a participative education project with six interactive sessions
- production and story for a series of four short movies
- adapted the program for distance learning with extended asynchronous segments
- developed and implemented recycling workshops for public events

Ich kann autonome Roboter! (March 2.–6. 2020) developed and instructed a workshop for children to build, explore, reenact, understand, document, and present autonomous robots, 24 participants, Hamburg

Aus Plastik wird Kunst (July 22.–26. 2019) developed and instructed and art camp for children, Talentcampus der Volkshochschule (VHS) Hamburg and Precious Plastic Hamburg (PPHH)

Sorting Competition (March 2019) organizer, event about plastics recycability and recycling, with Primary School Grumbrechtstraße, Technical University Hamburg (TUHH), and PPHH

Financial and Insurance Mathematics (SS 2019); Analysis I–II (WS 2017/18–SS 2019); Stochastics (WS 2018/19); tutor, exercises, Mathematical Institute, Heinrich-Heine-Universität, Düsseldorf

Dynamic Field Theory (June 2010; June 2009; June 2008) tutor, workshop, Summer School, University of Iowa, Iowa City, Iowa, USA

Overhead ‘bots (June, October 2010; June 2009) organizer and tutor, workshop for children, Building Autonomous Solar Robots, in collaboration with derstrudel, DELTA Center, Iowa City Public Library and Iowa Children’s Museum, Iowa City, Iowa, USA

Infant Development (WS 2008) lecturer, university course with 32 undergraduate students, Department of Psychology, University of Iowa, Iowa City, Iowa, USA

Computer Vision and Autonomous Robotics (WS 2003/04; WS 2002/03) organizer and tutor, internship, Institut für Neuroinformatik, Ruhr-Universität-Bochum

Experimental Psychology I–II (WT–FT 1999) teaching assistant and tutor, Department of Psychology, Helmut-Schmidt-Universität, Universität der Bundeswehr Hamburg

Stochastics (SS 2000); Linear Algebra and Geometry I–II (WS 1996/97–SS 97); Analysis I–III (WS 1994/95–WS 1995/96) tutor, exercises, Department of Mathematics, Universität Hamburg

Primary School Mathematics (April, 1996) teaching intern at a Primary School, part of a Mathematical Education course at the University of Edinburgh, UK

COMMUNITY AND OUTREACH

09/2019–03/2020 **iCanRobots** in collaboration with derstrudel.org Hamburg
 obtained a grant developed and led a play-and-learn robotics workshop for children at a neighborhood nonprofit association, Alles wird schön e. V., March 2–6 w/ 24 participants

01/2019– **Precious Plastic Hamburg (PPHH)** Hamburg
 founding member a citizen organization for (plastic) waste reduction and sustainability
 goal to educate about sustainable consumption using science, engineering, and creativity
 outreach

- developing educational activities and programs about sustainability (events, workshops, full week courses, and school projects)
- networking with local schools, nonprofit organizations, municipal facility SRH, and TUHH
- representing PPHH at the FabCity consortium, in which Hamburg’s open workspaces join forces to foster local manufacturing by enabling participation—empowering by making
- securing funding, e.g., Harburg21 neighborhood sustainability prize, a mandate from the European Cities for Circular Economy www.ce-force.eu project FORCE
- joining Royal Society meetings in London and Chicheley, UK about “Scientific Priorities for Realising a Circular Economy”
- presenting the PPHH concept for university students, experts in professional education, municipal facility professionals, communal activist associations, and in township meetings

09/2018– dancer in community projects by Patricia Caroline May & INTEAM Hamburg
 at [K3] Tanzplan Hamburg auf Kampnagel
 projects HAMONIM (premiere March 19. 2019) / ALLIN (film, 2020) / WAHN/MANIA (film and performance 2021)
 performances at Kampnagel/Hamburg, STAMP Festival Altonale/Hamburg, MARKK museum/Hamburg, ARK at Ringlokschuppen/Mühlheim Ruhr, and film

07/2007–05/2011 **DELTA Center** Iowa City, Iowa
 Development and Learning from Theory to Application
 member interdisciplinary affiliation of scientists who study human development
 organizer, tutor robotics workshop for children in collaboration with the collective [derstrudel](http://derstrudel.org), the Iowa City Public Library, and Iowa Children’s Museum

GRANTS AND AWARDS

February 2020–January 2021 30 000 € obtained mandate „Nachhaltigkeit und Kunststoffrecycling“ from the European Cities for Circular Economy [FORCE] www.ce-force.eu for PPHH via the SRH

- November 2019, Neighborhood Sustainability Prize** 2 500 € awarded by Harburg21 to Precious Plastic Hamburg (PPHH) for our engagement in sustainability education
- September 2019, Workshop Grant** 10 000 € awarded by the Foundation Deutsche Telekom Stiftung to develop a play-and-learn concept „Ich kann autonome Roboter!“ for children
- June 2014, Workshop Prize** 5 000 € Grant to organize a collaboration workshop, DLR, Germany
- February 2010, Symposium Prize** 4 000 \$ Grant to host a Symposium, DELTA Center, UI, Iowa
- June 2005, Conference Prize** 300 \$ Grant for Poster Presentation, University of Iowa (UI), Iowa
- October 2001–October 2004, Ph.D. Stipend** monthly 1 278 €, International Graduate School of Neuroscience (IGSN), granted by the state of North Rhine-Westphalia, Germany

NOT FOUNDED GRANTS

- May 2020, ourFabCity – Wir Fabrizieren in Hamburg** PI: developed a workshop on circular economy for young people to acquire fabrication skills at really do-it-yourself (DIY) distributed production at diverse open workspace that are members of the FabCity consortium Hamburg
- March 2016, Knowledge Management in Transdisciplinary Engineering** PI: developed a research proposal to explore the use of Communication and Information Technology (CIT) for collaboration in holistic engineering projects, not submitted to the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG)
- March 2014, Project Based Learning (PBL) for Aircraft Design Methods (ADM)** co-developed a transdisciplinary aircraft design curriculum for the DLR/TUHH package in a EU-wide Knowledge Alliance consortium KA-PEFu+, submitted to ERASMUS+ (EU funding for advancement in higher education)
- May 2011, An experiential, inquiry-based curriculum for students to explore neuroscience** PI: developed a K12 Neuroscience Curriculum, a university and small business collaboration, proposed at NIH

AFFILIATIONS

- 2021– Affiliate, eduScrum CoP** international/German eduScrum Community of Practice
- 2011– Alumina, DELTA Center** Development and Learning from Theory to Application (DELTA)
- 2007–2011 Post-Doctoral Member, DELTA Center** University of Iowa, IA deltacenter.uiowa.edu
- 2007–2011 Member, WISE: Women In Science and Engineering**, University of Iowa, IA

MULTICULTURAL EXPERIENCE AND LANGUAGES

I lived in Bulgaria, Germany, the USA, and Scotland and am fluent in Bulgarian, German, and English.

SERVICES

- since October 2020** Developing an infrastructure for a Community of Practice for educational practice and research
- November 2017–October 2019, Representative** Examination Board, Bachelor’s program „Finanz- und Versicherungsmathematik“,
- 2014, September, Organizer** WissensAustauschWorkshop (WAW) „Visualisierung großer Datenmengen in der Wissenschaft (VisDa2)“ at the Integrated Design Lab (IDL), DLR
- 2011, April, Organizer** Symposium “Perspectives on Learning in Social Contexts”, DELTA Center
- 2008, October, Invited Scientist** “Human and Social Dynamics (HSD)”, Grantees Conference, National Science Foundation (NSF), Washington, DC, USA
- 2007, July, Co-Organizer** Symposium “Current Directions in the Dynamical Systems Approach to Development”, International Conference on Perception and Action (ICPA-14), Yokohama, Japan

Ad hoc Reviewer, Journals: *Adaptive Behavior*; *IEEE-TAMD*; *Journal of Aerospace Operations*; *Journal of Motor Behavior*; MDPI journals *International Journal of Environmental Research and Public Health* and *Robotics*

Conferences: FAB16 #Fabricating the Commons (international Fab Lab network)

Annual Meeting of the Cognitive Science Society (CogSci)

International ISPE Conference on Concurrent Engineering (CE)

International ISPE Conference on Transdisciplinary Engineering (TE)

International Conference on Development and Learning (ICDL)

International Conference on Epigenetic Robotics (EpiRobot)

Textbooks: "Toward a New Grand Theory of Development? Connectionism and Dynamic Systems Theory Re-Considered" J. P. Spencer, M. S. Thomas, and J.L. McClelland (Editors)

2002, Student Representative Appointment Committee: Director, International Graduate School of Neuroscience, Ruhr-Universität-Bochum

1998, Student Representative Appointment Committee: Mathematics Professor, Uni Hamburg

1998, Co-Organizer Konferenz Deutschsprachiger Mathematik Fachschaften, Hamburg

1996, 1994, Student Representative Department of Mathematics, Universität Hamburg

COMPUTER SKILLS

data handling: R; SPSS; PL/SQL; Oracle Forms; Matlab w/ toolboxes

learning/content management systems: Moodle; ILIAS/TYPO3

experimental design, robotics, visualization: C/C++; Qt; scripting languages, Matlab w/ GUIDE

collaborative tools: Eclipse; Atlassian; Sharepoint

operating systems: Linux; macOS; Windows

Hamburg, November 15, 2021

