7th German-Brazilian Dialogue on Science, Research and Innovation 2018

Information about speakers and presentations

DAY 1 – OCTOBER, 30th

➢ **Introduction Session: The Challenges and Changes in Working and Learning in a Digital World**

Moderator: **Ronald Dauscha**, *Director of Fraunhofer Liaison Office Brazil*

> Keynote Speaker Germany

Hartmut Hirsch-Kreinsen

Former Chair of Economic and Industrial Sociology and appointed senior professor at TU Dortmund University. Member of the Research Advisory Board of the Platform Industry 4.0 in Germany
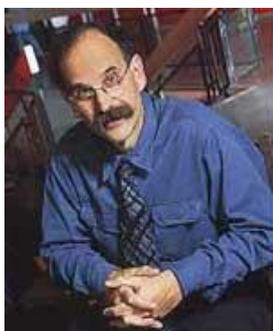
Curriculum

Hartmut Hirsch-Kreinsen holds the Chair of Economic and Industrial Sociology at TU Dortmund University (1997– 2015); since April 2015 appointed senior research professor at TU Dortmund University; Research Associate at the TH Darmstadt University and the Institute for Social Research Munich (ISF München) (1980 – 1997); Visiting professor at several foreign universities and member of national and international advisory councils in the field of innovation policy and the future development of work. A main research area is the digitalization of production, resp. Industry 4.0 and its consequences for skills, working conditions and labor markets.

Presentation: Digitalization and the transformation of work

The thesis of the contribution is that as a result of digitalization a far-reaching, but so far hardly predictable transformation of work can be expected: On the one hand, job losses as consequences of new technologies are currently hardly to predict. On the other hand, a broad spectrum of conceivable consequences for skills and qualifications can be assumed. It will be shown that the transformation of work is highly dependent on corporate strategies and socio-political design. The new technologies are to be understood as socio-technical systems that open up a variety of design options, especially for skill-oriented work patterns.

> Keynote Speaker Brazil

Glauco Arbix

Full Professor of Sociology at the University of São Paulo, and head of the Observatory for Innovation, at the Institute of Advanced Studies at the University of São Paulo

Curriculum

Glauco Arbix is Full Professor of Sociology at the University of São Paulo, and head of the Observatory for Innovation, at the Institute of Advanced Studies at the University of São Paulo. Tinker Professor at the University of Wisconsin-Madison (2010), former president of the Brazilian Agency for Innovation (Finep, 2011-2015), and of the Institute for Applied Economic Research (IPEA – 2003-2006). General coordinator of the Strategic Unit (NAE – 2003-2006, an advisory board to the President of the Republic), member of the UNDP's International Advisory Group (2006-2009), and of the Brazilian National Council of Science and Technology (2007-2010). Visiting Scholar at the Massachusetts Institute of Technology (2010, USA), research fellow at Columbia University (2009, USA), and at the London School of Economics (2001, UK).

Presentation: The changing nature of work

Despite its incipient stage, a wave of new technologies is transforming our lives at home and at work, powering an expansion in human activities. It changes businesses, manufacturing, services, commerce

and agriculture. And turns markets, educational and healthcare systems upside-down. Emerging countries are trying to keep up with the new cycle of innovation, which to a large extent they are at the margins of. They are hoping for a better future, but with great apprehension as well. Brazil may find in the advance of S&T a viable path to revert their poor economic performance and reduce social disparities. But today, digital technologies are disrupting work for working people — blue- and white-collar alike —in every occupation. Advances in fields such as artificial intelligence and robotics are making it increasingly possible for machines to perform not only physical but also cognitive tasks. Actually, in this new Industrial cycle, automation and digital devices are upending jobs, from cashiers to automotive assembly-line workers, yet studies are not conclusive so far. In the past, technology constantly created new jobs and new conveniences. However, we know little about the future. But we do know for certainty that tomorrow's jobs will be very different from today's, and it's critical to prepare people to succeed in rapidly growing new environment. What skills will be needed and how do workers find jobs once they are properly trained? How can more people around the globe 'plug in' to the digital economy? Because of its transformative power, it is key to foster cooperation in technology research inside Brazilian universities and enterprises, with full support from both the German and Brazilian governments and public agencies.

DAY 2 – OCTOBER, 31st

Panel 1 - Working in a Digital World

Moderator*: **Eduardo Zancul**, Professor at the Polytechnic School (Poli) of University of São Paulo (USP)*

➤ **Session 1.1 - Main Technological Trends Affecting Work and Jobs**

Luis Lamb

Professor and Vice President for Research (Pro-Rector for Research) at the Federal University of Rio Grande do Sul, Porto Alegre

Curriculum

Luis Lamb is Professor and Vice President for Research (Pro-Rector for Research) at the Federal University of Rio Grande do Sul, Porto Alegre, Brazil. He holds both the Ph.D. in Computing Science from the Imperial College London (2000) and the Diploma of the Imperial College (D.I.C.) (2000), MSc by research (1995) and BSc in Computer Science (1992) from UFRGS, Brazil. His research interests include: Logic, Artificial Intelligence and Machine Learning and Reasoning. His research has been published at the flagship AI conferences AAAI, NIPS and IJCAI. Lamb has also co-authored two research monographs and several papers in leading Computer Science Journals.

Presentation: Technological and Social Impacts of Artificial Intelligence

Artificial Intelligence has transformed the way we imagine the future of our lives. Such has been the impact of today's A.I. research that leading academics, businessmen and politicians have voiced several concerns about the field's impact on the future of humanity. In this talk I outline relevant developments in A.I highlighting both their recent use and the perspectives A.I. technologies have on several aspects of society, including the ethical implications of the potential wide use of A.I. technologies.

Bernd Dworschak

Team leader of the team "Competence Management" at the Fraunhofer Institute for Industrial Engineering in Stuttgart, Germany

Curriculum

Bernd Dworschak is team leader of the team "Competence Management" at the Fraunhofer Institute for Industrial Engineering in Stuttgart, Germany. He studied sociology and English literature at the universities of Tübingen (Germany) and Leicester (UK). Activities include the coordination of the network FreQueNz „Network for early identification of skill needs" funded by the German Federal Ministry of Education and Research. This network is also member of Skillsnet – the European network on early identification of skills needs by Cedefop. Apart from the early identification of skill needs his research interests include

concepts for competence management and development in integrated industry and advanced manufacturing. Currently, he focuses on the impact of digitization and industry 4.0 on work, competences and competence development.

Presentation: Main Technological Trends in Digitization and Industry 4.0

Affecting Work and Jobs This contribution focuses at main technological trends in digitization and Industry 4.0 and how they might affect the quantitative development of jobs and the qualitative development of work requirements in general. Since there are different development patterns, the contribution operates with scenarios having different implications for work and jobs. An important conclusion here is that technologies can be modified, adapted or shaped along the lines of a work design either promoting or reducing the quality of work and the quantity of jobs.

➢ **Session 1.2 - Structural / Qualitative Development and Organization of Labor**

Afonso Fleury

Professor in the area of Work, Technology and Organization at the University of Sao Paulo and (former) head of the Production Engineering Department

Curriculum

Afonso Fleury is Professor in the area of Work, Technology and Organization at the University of Sao Paulo and (former) head of the Production Engineering Department. His research work focuses areas like Work Organization, Technology Management, Industrial and Technology Policies. He was a visiting scholar at the Institute of Development Studies (UK), Tokyo Institute of Technology (Japan), LATTS - École Nationale des Ponts et Chaussés (France) and Institute for Manufacturing, University of Cambridge (UK). Having prepared projects for ILO, UNU, IDRC, IDE and CEPAL, among others, he is currently engaged in research about International Business and International Operations Management.

Presentation: Towards another new international division of labor

The rise of emerging countries had profound repercussions in not only international investment and trade; it affected the industrial structure of advanced countries as well. Not only emerging market multinationals started to claim for global leadership in some industries, but also advanced country multinationals changed their international strategies by offshoring operations into emerging countries. Consequently, advanced countries started to lose protagonism and evidences of macro-problems associated to employment and income appeared in the radar.

In that scenario, digitalization provided a key tool to stop and reverse the process. Based on the commonsense of the ̄natural and neutral‗ character of technological progress, advanced countries started huge programs to accelerate technological research and shift the operational basis of their own enterprises. To a large extent, those shifts erode the current comparative advantages of emerging countries, leading to reshoring or backshoring, and also create new competitive factors, which will hardly be accessible for emerging countries in the short term.

Therefore, while advanced countries are creating the conditions to reorganize their structures for jobs, employment and value generation they are taking off balance other countries and inducing another new international division of labor. That problem is amplified in countries which industrialization was heavily based in subsidiaries of advanced country multinationals, as is the case of Brazil and Latin America. In this presentation I will analyze deeper the positions assumed by different countries in regards to digital technologies and the challenges that the transition from Industry 3.0 to 4.0 creates for the Brazilian economic and social development.

Martin Kuhlmann

Senior researcher and co-ordinator of the research perspective „Arbeit – Organisation – Subjekt‟ at Soziologisches Forschungsinstitut (SOFI) Göttingen – Sociological Research Institute at the University of Göttingen

Curriculum

Martin Kuhlmann, a sociologist of work & labour is working as a senior researcher and co-ordinator of the research perspective „Arbeit –

Organisation – Subjekt‾ at Soziologisches Forschungsinstitut (SOFI) Göttingen – Sociological Research Institute at the University of Göttingen. Former and ongoing research is covering the field of sociology of work & labour as well as industrial relations. He has published on issues like work and new technologies, work and new management concepts, the development of work in different industries, innovative work policies/high-performance work practices/sustainable work systems, and on current trends in the field of industrial relations. Currently, he is working on several research projects in the field of ‾digitization / industry 4.0 and work.

Presentation: Work and organization in the digital world: challenges and perspectives

In the light of massive investments in digitization technologies and a political agenda setting that evokes the lack of alternatives for a 'digital transformation', there are voices amongst labor researchers that are attributing new technologies a high degree of quasi-deterministic influence on work. In addition, digitization is often seen as the technical basis for an extended and intensified control of the labor process, which increasingly reaches out to higher-skilled work. Based on current research, mainly on several industrial sectors, the presentation argues for a non-deterministic, differentiated analysis of the relationship between technology and work, which is capable to identify (1) typical patterns of effects of digitization on work, (2) specific challenges because of digitization as well as (3) work policy and design options.

➢ **Session 1.3 - Different Perspectives of Employment Development**

Naercio Menezes Filho

IFB Professor of Economics and Director of the Centre for Public Policies at Insper and Associate Professor of Economics at the University of Sao Paulo

Curriculum

Naercio Menezes Filho is the IFB Professor of Economics and Director of the Centre for Public Policies at Insper. He is also Associate Professor of Economics at the University of Sao Paulo, Fellow of the

Brazilian Academy of Sciences, Consultant to Fundação Itaú Social and Columnist for the newspaper "Valor". He has published several papers in national and international academic journals in the areas of Education, Inequality, Employment, Trade, Productivity and Innovation.

Presentation: The Employment Consequences of New Technologies

We examine the predictions of different economic theories about the employment consequences of the introduction of new technologies, their impact on income inequality and the perspectives in terms of innovation and employment for Brazilian workers and firms.

Joachim Möller

Director of the Institute for Employment Research of the Federal Employment Agency (IAB), Nuremberg and Full Professor of Economics at the University of Regensburg

Curriculum

Joachim Möller studied Philosophy and Economics at the Universities of Tübingen, Strasbourg and Konstanz. He was granted a Doctorate in social sciences in 1981 the teaching qualification for higher education in economics (Habilitation) in 1990. In 2008 conferment of an Honorary Doctorate by Leuphana University Lüneburg. Joachim Möller is Full Professor of Economics at the University of Regensburg since 1991. Besides this, he was elected member of the Executive Committee of the European Association of Labour Economists (EALE) and elected head of the Research Committee for Regional Economics of the German Economic Association (Verein für Socialpolitik). From 2005-2007 he was the Director of the Institute for East European Studies (Osteuropa-Institut München). Since October 2007, Joachim Möller is the Director of the Institute for Employment Research of the Federal Employment Agency (IAB), Nuremberg. His research interests include Labour Economics, Regional Economics, Empirical Macroeconomics and Applied Econometrics.

Presentation: How does Digitization affect the German Labor Market?

The German economy is experiencing a long-lasting upswing. Employment has risen to a historical high and unemployment is low. Despite this positive development there are widespread fears of job insecurity in the years to come. Soft robots, cyber-physical systems, machine learning and other forms of artificial intelligence could lead to a new wave of substituting human workers by technology. These processes are increasingly affecting not only the manufacturing sector but also service industries and agriculture. Therefore, the question arises whether the fears of huge job losses justified. How digitization affects structural change and the skill composition of the workforce? What are the consequences for labor market policy?

Panel 2 - Skills and Learning in a Digital World

Moderator: **Ana Maria Almeida**, *Associate Professor of the School of Education of State University Campinas (Unicamp)*

➢ Session 2.1 - Needed Interchangeable and Soft Skills in a Digital World

Markus Feufel

Head of the Division of Ergonomics of the Department of Psychology and Ergonomics at Technische Universität Berlin

Curriculum

Markus A. Feufel obtained an engineering degree in audiovisual media and an MS and PhD in Human Factors and I/O Psychology. He currently heads the Division of Ergonomics of the Department of Psychology and Ergonomics at Technische Universität Berlin. Markus does research in Applied Psychology and Medical Anthropology with the goal to help improve efficiency and reliability of work and decision processes. His general goal is to understand how work systems adapt to changing demands, such as technological developments, and how we can empower people to help shape this adaptation effectively and actively via system design and/or educational interventions.

Presentation: Boosting skills for a digital future: Perspectives from Human Factors & Ergonomics

Due to cognitive limitations, most decisions are based on heuristics, which result in errors that violate logic and probability theory. People's decisions should thus be ñudged_ or digitally supported/replaced. Yet, research in naturalistic work domains shows that heuristics are the very basis of expert decisions and errors are inevitable not due to irrationality but domain complexity. Using examples from medicine, I will suggest that, although errors are inevitable, heuristics should not be avoided. Instead, we should teach and learn when to use a heuristic or rely on computers, and how to make ˌsmartˈ rather than ˌdumbˈ mistakes. Pedagogical implications for boosting the use of heuristics will be discussed.

Simon Schartzman

Collaborator at Institute of Studies on Labor and Society (IETS), Rio de Janeiro

Curriculum

Ph.D. in Political Science from the University of California, Berkeley; former President of the Brazilian Institute for Geography and Statistics I(IBGE) and member of the Brazilian Academy of Sciences. Co-coordinator of chapter 19 on The Contribution of Education to Social Progress in Rethinking Society for the 21st Century (International Panel for Social Progress), Cambridge University Press, 2018. Recent books include Education in South America (Bloomsbury Academic, 2015) and Higher Education in the BRICS Countries (with Romulo Pinheiro and Pundy Pilay, Elsevier, 2015)

Presentation: Secondary education reform: will and should it bring students closer to the labor market?

In 2017, Brazil approved a new legislation for upper secondary education, which has been very traditional, and unable to reach the minimum standards and diversification compatible with the requirements of the new knowledge economy and the characteristics of its student population. The main goals of the new legislation are to increase the amount of time of instruction, to move from a discipline to a

competence-based curriculum, to allow students aiming at higher education to chose their areas of concentration, and to increase access to vocational education, bringing it closer to the secondary education mainstream. The main question is what extent this goals, still to be implemented, are likely to bring Brazil closer to the new and future demands of the labor market.

➢ Session 2.2 – Teaching and Learning Methods to Build-up New Skills

José Armando Valente

Full Professor of the Multimedia Department at the Art Institute and Researcher of the Nucleus of Informatics Applied to Education (NIED), Coordinator of the Management Group on Educational Technologies (GGTE), at State University Campinas (Unicamp)

Curriculum

José Armando Valente has a habilitation from the State University of Campinas (UNICAMP). MSc and PhD from the Massachusetts Institute of Technology (MIT). Tenure Professor at the Media Studies Department, Arts Institute, and Researcher of the Nucleus of Informatics Applied to Education (NIED) at UNICAMP. Collaborating Professor in the Graduate Program in Education: Curriculum at Pontifical Catholic University of São Paulo (PUC-SP).

Presentation: Innovation in Teaching and Learning Processes: the role of digital technologies

The objective of the talk is to discuss what it means to teach and learn in the digital world, and to propose some innovations in the teaching and learning processes provided by digital technologies. Innovations include active learning methodologies, pedagogical approaches beyond academic cages, institutional effort to embrace students, and practice of continuous innovation on the part of educational institutions and students.

Gerrit Posselt

*Head of research group „Learning Factory"
at the Technische Universität Braunschweig
within the Institute of Machine Tools and
Production Technology.*

Curriculum

Dr. Gerrit Posselt, is working a post-doctoral researcher heading a research group "learning factory" since June 2015. As the head of research group he is responsible for administrating and coordinating the research factory (real sized industrial test bed), the experience lab (innovative problem-based teaching and learning system) and the education lab (vocational training), its research fellows, technicians and trainers within the Technische Universität Braunschweig. He coordinates national as well as international research projects, consulting/development projects and professional trainings for national and international industries. Since 2017,Dr. Gerrit Posselt has been working on a spin-off in the area if innovative teaching and learning systems, which is, sinceOctober2018 successfully funded by the German Federal Ministry for Economic Affairs and Energy with an EXIST Business Start-up Grant.

Presentation: Educating 21st century skill sets with innovative teaching learning systems

Innovation, transformation and new technologies pose enormous challenges for companies and employees. How can companies and employees be best possibly supported to qualify their workforce for the new markets and working environments of today and tomorrow? Innovative teaching and learning concepts like game- game-based learning or research-based education in learning factories address precisely these issues. Game-based learning enables the effective transfer of complex knowledge and competencies. The scientifically determined success is proven by several years of research. In contrast to conventional learning methods, testing and immersion in the respective context are particularly suitable for learning and developing specialist knowledge and social, system and innovation skills. Research-based learning in learning factories on the other hand allow to learn in highly immersive environments and put the focus on professional, action, social and self-competences. The presentation will focus on presenting the methods behind the two innovative learning approaches

and will show examples of implementation with the experience from ongoing research projects.

➢ Session 2.3 - Learning for all Distinct Age, Skill and Social Groups

Monika Hackel

Head of Department 2 Structure and Regulation of Vocational Education and Training and Vocational Education and Training for People with Disabilities at the Federal Institute for Vocational Education and Training in Germany (BIBB)

Curriculum

Since 2016 Dr. Monika Hackel is Head of Department 2 Structure and Regulation of Vocational Education and Training; Vocational Education and Training for People with Disabilities, at the Federal Institute for Vocational Education and Training in Germany (BIBB). Before she worked in various jobs in the BIBB. Her special focus lies on the analysis, conception and evaluation of qualification and certification concepts in VET. Another Research interest lies on technological innovation and education. After finishing her doctoral research study at FernUniversität in Hagen, she worked as a self-employed consultant in the field of systemic and strategic consulting in the mechanical and plant industry. Dr. Hackel is member of the German Society for Ergonomics and Work Science (GfA) and the International Society for Cultural and Activity Research (ISCAR). She has also been appointed to the advisory board of the Institute of Technology and Education (ITB) at the University of Bremen, the Youth Education and Development Foundation of Machine-building and the Institute for Professional Apprenticeship for the German Insurance Industry.

Presentation: Leaving no apprentice behind on the way to a digital world of work

The world of work in Germany is undergoing increasing automation and digitization while at the same time demographic change strongly influences the training market. The demand of leaving no apprentice behind takes a new dimension in this context. With regard to the structures and conditions of the German VET System in relation to

different educational groups, the lecture presents research findings from different projects of the education 4.0 initiative. The initiative forms part of the implementation process of the Federal Government's Digital Agenda 2014-2017. It aims to tackle the current challenges facing the vocational education and training system and draw conclusions to further modifications within the system.

Márcia Lima

Professor at the Department of Sociology, University of São Paulo and senior researcher at CEBRAP (Brazilian Center for Analysis and Planning)

Curriculum

Márcia Lima is Professor at the Department of Sociology, University of São Paulo, since 2004. She is a senior researcher at CEBRAP (Brazilian Center for Analysis and Planning). In 2016-2017, she was fellow at Afro-Latin American Research Institute/Hutchins Center for African & African American Research - Harvard University. In 2011-2012, she did her postdoc stage at Columbia University. Her research focuses on racial inequality studies. She has published and supervised students in the following areas: labor market, educational trajectories, race and gender inequalities, and affirmative action policies in Brazil.

Presentation: Learning for all: Challenges to racial and social inclusion.

The primary objective of the lecture will be to draw attention to the specific challenges of racial and social inclusion in the educational process. The idea of learning for all needs strategies to combat the discriminatory procedures present in the school environment.

➢ **Final Keynotes: National Research and Technology Policies to Promote Digitalization Processes and the Development of Skills**

Moderator: **Ronald Dauscha**, *Director of Fraunhofer Liaison Office Brazil*

Klaus Kreulich

Vice President for Innovation and Quality of Education at University of Applied Sciences of Munich (HS München)

Curriculum

Klaus Kreulich was appointed as Vice President of Munich University of Applied Sciences (MUAS) in 2014. He is responsible for Innovation Management in Teaching and Study as well as Academic Quality Management. A key challenge of his work is implementing a strategy, which leads to student's qualifications for the future living and business world that is informed by Digitalization and Industry 4.0. Klaus Kreulich studied Physics at the University of Münster and earned his PhD at the Institute of Print and Media Technology of the Technical University of Chemnitz. He has been Professor for Media Technology at MUAS since 2003.

Besides research and teaching, he has many years of experiences in strategic university development. Before joining the Executive Board, he served as Head of Department and Head of study program. Within the University sector, Klaus Kreulich takes an active part as advisor and expert for several institutions such as, for example, accreditation agencies and the Federation of Industrial Research Associations (AiF). On behalf of the Bavarian State Ministry of Science and Education, he advises Universities in the development of academic quality management. In the field of digitalization he is a sought-after strategic pioneer. Among others he has been commissioned by the Nexus-Project of the German Rectors' Conference (HRK) in strategical digitalization activities for the German higher education landscape.

Presentation: German Political Agenda to Promote Universities in the Context of Digitalization

In Germany, the challenge of digitization has become integral part of the political debate for several years. The associated need for the strategic further development of the universities in the fields of

research, teaching and transfer is accompanied by numerous funding programs. The presentation introduces nationwide and regional initiatives from politics and business with a focus on new working environments and digital skills. Based on the effects of the previous and ongoing initiatives, options for future policy areas and measures will be developed. These options provide a starting point for proposals for prospective joint initiatives of Brazil and Germany to foster working and learning in a digital world.