

## PRODUCTIVE TEAMING



### 28.03.2023 - **One symposium, three universities: Successful interdisciplinary dialogue between scientists on the human-centred future of production**

The tri-university research initiative "Productive Teaming" brought together more than 40 scientists from different institutions to discuss an exchange as well as cooperation possibilities on the topic of "Teaming between human and artificial agents" and to develop solution approaches for increasing productivity.

The symposium of the research initiative "Productive Teaming" took place at TU Chemnitz on 17 March 2023. More than 40 members of the Magdeburg Research and Innovation Network ("CHIM") accepted the invitation to the symposium. TU Magdeburg, TU Ilmenau and the Fraunhofer Institute in Chemnitz

participated in the research initiative, Prof. Dr. Dr. Marco Ragni (TU Chemnitz, Head of the Institute for Predictive Behaviour Analysis), Prof. Dr. Frank Ortmeier (OVGU Magdeburg) and Prof. Dr. Gunter Notni (TU Ilmenau, Head of the Department of Production Engineering) presented both the research initiative itself and the grouping of the individual scientists. This was an opportunity for all participants to gain an overview of the subject areas and projects of the

research initiative. Each scientist presented their own project in a poster session with a total of 25 posters. The symposium showcased the expertise of the scientists in the various fields. During and after the symposium, the participants discussed the presented projects, to work out further questions and possible

. This symposium thus offered the scientists a suitable platform for  
d the impetus for a planned manifesto on "Productive Teaming", which


he results of the day and gave an outlook on how these results can b  
of "Productive Teaming". Prof. Ragni: "The Productive Teaming  
d in the research initiative the opportunity to gain valuable insights into  
ossible collaborations". The research initiative thus underlines the  
al intelligence (AI), psychology and mechanical engineering, not only  
vel. Each university brings its respective strengths from its core  
s subject areas and complementing each other. "With our CHIM  
ion and exchange between researchers at the three locations in  
future research projects and initiatives," says Ragni.

, intelligent, adaptive and autonomous cyber-technical systems that c  
d skills of humans in solving tomorrow's new challenges. This constar  
es is currently leading to equally new and complex challenges in  
quickly and consistently. A key challenge in the field of production  
ns with myriad parameters that far exceed the capacities of individua  
problems and increase productivity, it will ultimately be necessary to  
ialised in such "teaming" between people and production systems.  
Chemnitz, the TU Ilmenau and the OVGU Magdeburg, which has  
on network "CHIM". The aim of this initiative is to better understand  
of overarching topic complexes and to find an answer to the following  
e cognitively augmented in such a way that they are able to  
artner within this process?

ere: <https://chim.hrz.tu-chemnitz.de/projekte/productive-teaming/>

Nithin Kashyap Venkatesha) (11 Bilder)

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## PRODUCTIVE TEAMING

Cognitive Algorithms for Anticipation and Synchronization of Human Information Processes with Cognitively Enhanced Production Systems  
Ragni, Armbruster, Brandenburg, Meyer – TU Chemnitz  
Wendemuth – OVG Universität

**RESEARCH QUESTION** Can we develop a cognitive system that is able to simulate and therefore anticipate the teaming partners' cognitive processes for a joint smooth collaboration and shared problem-solving process? Does this cognitive system lower human cognitive load and stress?

**PROJECT NOVELTY** Creation of the algorithmic foundations of production systems, which act as equal team partners, able to represent the common task and goals, to communicate and to make own contributions to problem-solving.

**METHODOLOGY**

**Forming a data base for the development of cognitive models**

- Collect data for cognitive and AI models in interaction processes

**Cue Detection for cognitive states**


- Test existing algorithms and develop new algorithms that can detect and infer the cognitive states of human interaction partners

**Mental simulation synchronization**

- Test the performance of existing systems for simulating and predicting human cognitive problem-solving processes

**Virtual bargaining**

- Refine the most promising models and consider how operations (including computations and physical ones) can be conducted by humans and production systems together



Wendemuth, T. (2018). Anticipation of Cognitive States in the context of Human-Machine Interaction. In: Proceedings of the 11th International Conference on Human-Computer Interaction (HCI), pp. 1-10.

**COOPERATIONS**

**D. Armbruster**

- Expertise on individual differences and complex problem solving

**S. Brandenburg**


- Expertise on empirical research concerning human reactions to variable system input and the design of Human-Machine-Interaction processes

**B. Meyer**

- Expertise on teaming processes, team interaction and complex problem solving

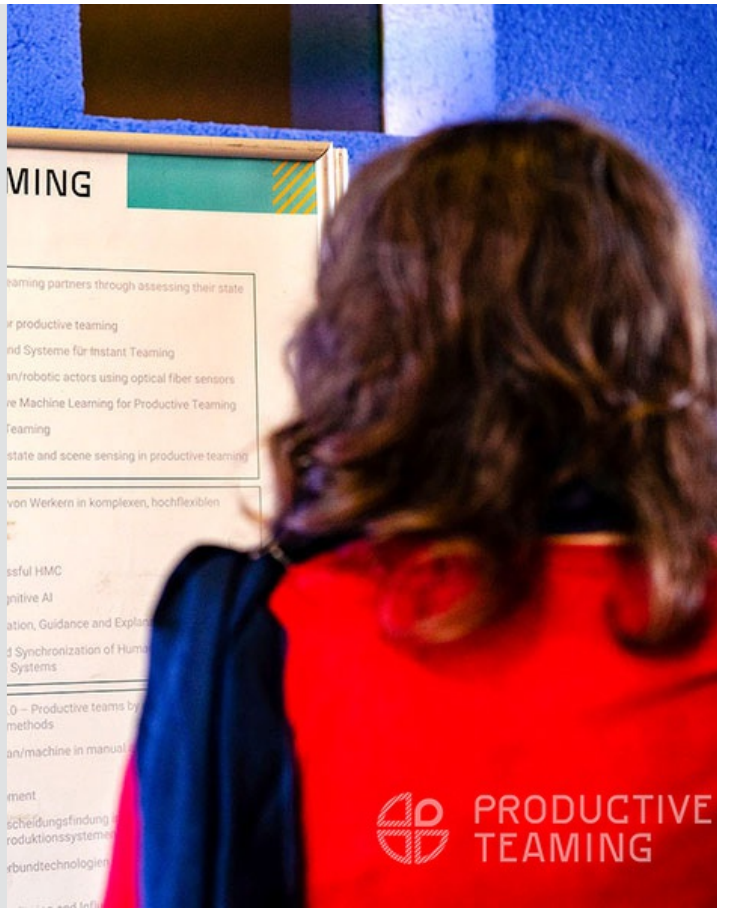
**A. Wendemuth**

- Expertise on signal processing, emotion recognition and behavior control









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## PRODUCTIVE TEAMING

Prof. Dr. Hans-Joachim Lenz, Neuro-Informatik (NI), OVGU  
 kontextsensitive Verhaltensanalyse von Workern in komplexen,  
 hochflexiblen Produktionsumgebungen

... sind die Herausforderungen der stabilen Handlungsabfolge in  
 der Produktion? Dabei werden die folgenden drei  
 Aspekte betrachtet:

1. **Handlungsabfolge**: Wie kann der Produktionsprozess visuell  
 dargestellt werden, um Interventionen intuitiv durchzuführen, ohne auf  
 die Experten zu warten?

2. **Handlungsabfolge**: In einer semantischen Szenarioanalyse  
 von Szenario- und Handlungsabläufen zu unterstützen?

3. **Handlungsabfolge**: Wie kann die Effizienz in der produktiven  
 Arbeit durch die Analyse von Szenario- und Handlungsabläufen zu steigern?

**Bisher**

- Handlungsabfolge mit statischen Maschinen/Robotern
- Starre Abläufe in starren Produktionsumgebungen
- Zufallsprodukte

**Produktionsumgebung**

- Produkte
- Industrie 4.0
- Zufall
- Produktionsumgebung

**Problemraum**  
 (Produkt, Produktionssysteme, Ausrüstung)

**Produktive Teaming**

Produktive Teaming ist die kontextsensitive Verhaltensanalyse von  
 den Handlungsmustern der Arbeiter in komplexen, hochflexiblen  
 Produktionsumgebungen. Das Verhalten analysiert notwendige Fähigkeiten, damit mobile  
 Arbeiter in komplexen, hochflexiblen Produktionsumgebungen (Produktionsumgebung)  
 effektiv arbeiten können.



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analyse von Wirkern in komplexen, reduktionsumgebungen

Wirkstoff-Reduktionsstudien sind ein zentraler Bestandteil der Wirkstoffentwicklung. In reduzierten Umgebungen können die Wirkstoffe besser verstanden werden, was zu einer schnelleren Identifizierung von Wirkstoffen führt.



Die Reduktion der Komplexität ist ein zentraler Bestandteil der Wirkstoffentwicklung. In reduzierten Umgebungen können die Wirkstoffe besser verstanden werden, was zu einer schnelleren Identifizierung von Wirkstoffen führt.



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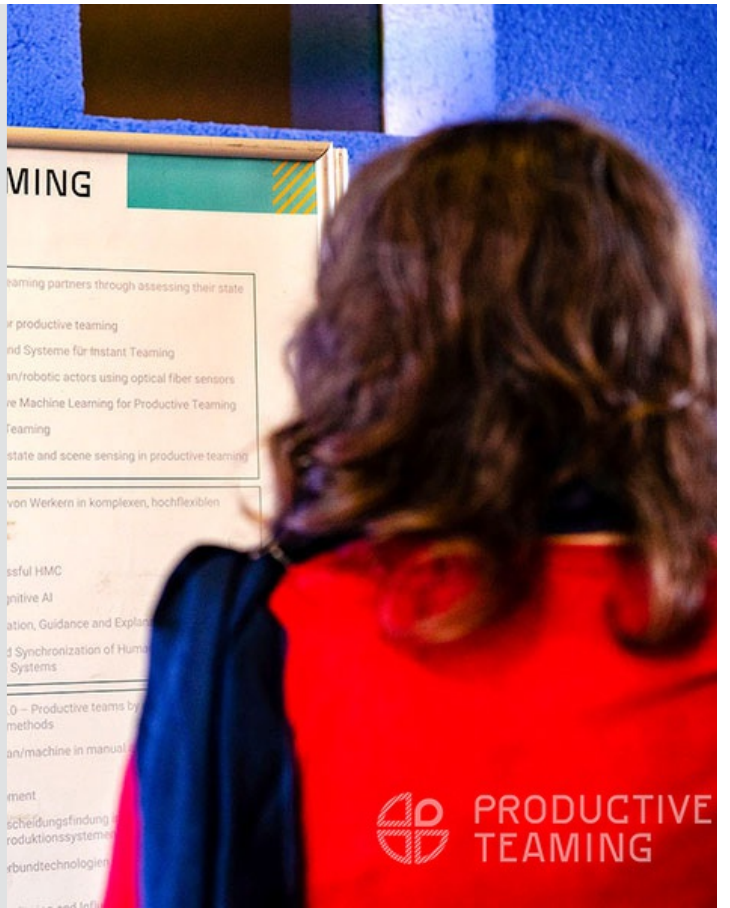
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TEAMING

« Zurück »



Spokespersons at OVGU ▶

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