

## 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 Magdeburg Research and Innovation Network ("CHIM") accepted the invitation to the symposium. The symposium was organized by OVGU Magdeburg, TU Ilmenau and the Fraunhofer Institute in Chemnitz.

Within 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) coordinated both the research initiative itself and the grouping of the individual scientists. This enabled them to gain an overview of the subject areas and projects of the participating scientists.

During the symposium, the scientists presented their own project in a poster session with a total of 25 posters. This provided an opportunity for the exchange of expertise of the scientists in the various fields. During and after the symposium, the scientists discussed the presented projects, to work out further questions and possible solutions.

. 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 be  
of "Productive Teaming". Prof. Ragni: "The Productive Teaming  
d in the research initiative the opportunity to gain valuable insights into  
possible collaborations". The research initiative thus underlines the  
al intelligence (AI), psychology and mechanical engineering, not only  
level. 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 constan  
s 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



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 behaviour control



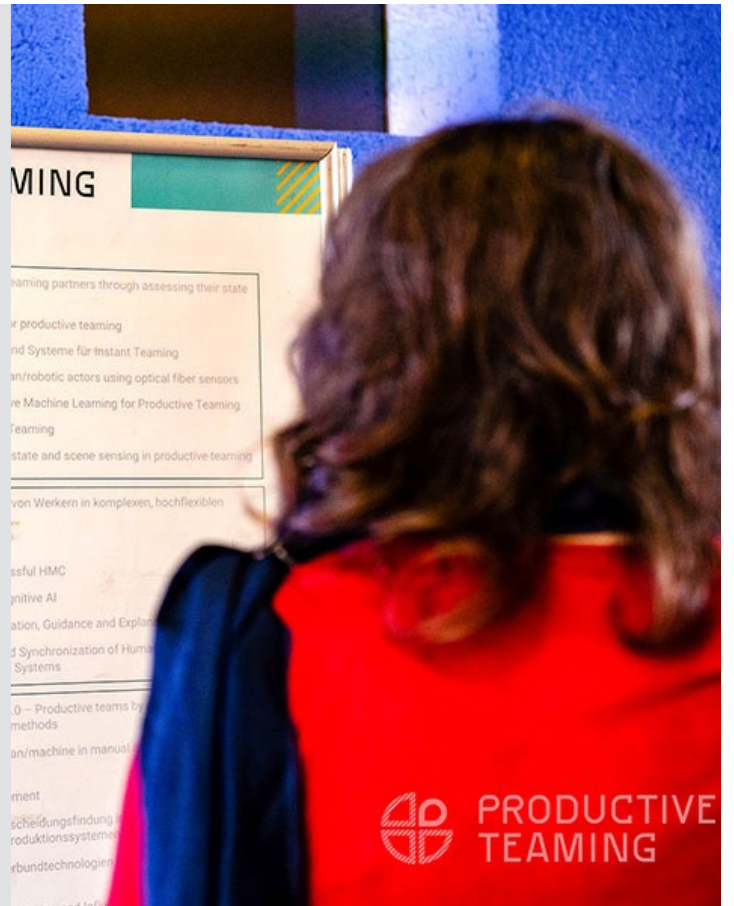


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Jens K. Rasmussen, Neuro-Informatik (NIT), OVGU  
 kontextsensitive Verhaltensanalyse von Workern in komplexen,  
 hochflexiblen Produktionsumgebungen

**Warum die Herausforderungen der simultanen Handlungsabstimmung in Produktionssystemen?** Dabei werden die folgenden drei Aspekte betrachtet:

- Handlungsabstimmung:** Wie können die Handlungsabstimmung von Personen im Produktionsprozess visuell gesteuert werden, um Interaktionen intuitiv durchzuführen, ohne auf die Experten zu warten?
- Handlungsabstimmung:** Wie können die Handlungsabstimmung in einer semantischen Szenenanalyse (z.B. Szenen- und Handlungsabstimmung) zu unterstützen?
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**Handlungsabstimmung:** Wie können die Handlungsabstimmung in einer semantischen Szenenanalyse (z.B. Szenen- und Handlungsabstimmung) zu unterstützen?

**Bisher:** Interaktion mit statischen Maschinen/Robotern  
 Geringe Flexibilität in technischen Produktionsprozessen  
 Geringe Flexibilität in technischen Produktionsprozessen  
 Geringe Flexibilität in technischen Produktionsprozessen

**Ziel:** Interaktion mit flexiblen Maschinen/Robotern  
 Hohe Flexibilität in technischen Produktionsprozessen  
 Hohe Flexibilität in technischen Produktionsprozessen  
 Hohe Flexibilität in technischen Produktionsprozessen

**Problemraum**  
 (Produkt, Produktionssysteme, Auslastung)

**Handlungsabstimmung:** Wie können die Handlungsabstimmung in einer semantischen Szenenanalyse (z.B. Szenen- und Handlungsabstimmung) zu unterstützen?

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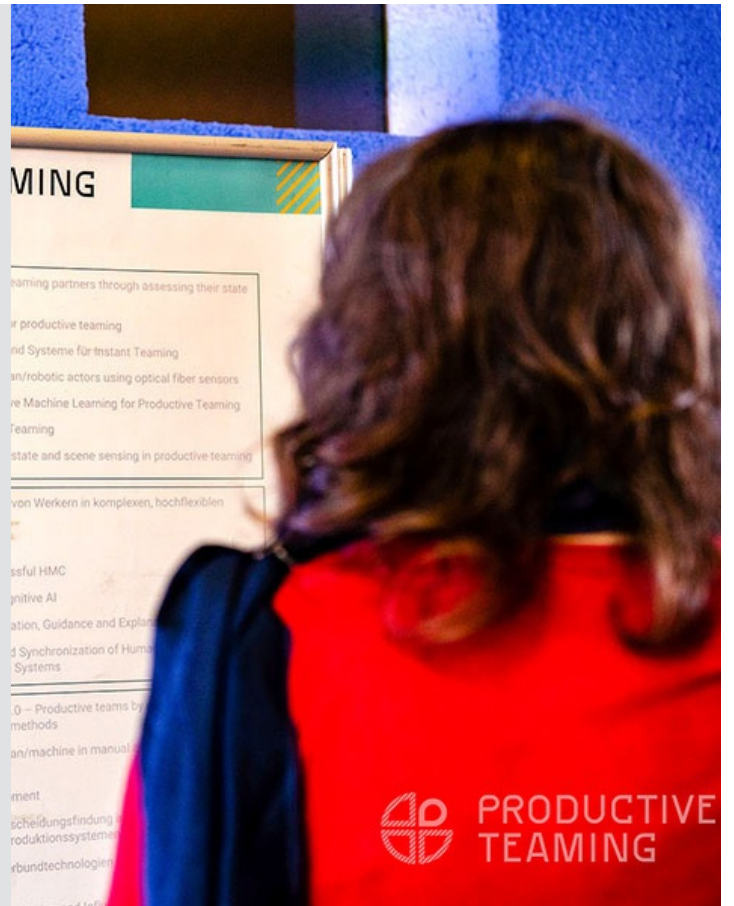


## PRODUCTIVE TEAMING













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PRODUCTIVE  
TEAMING

« Zurück »







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#### Spokespersons at TU Ilmenau

