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## Kontakt



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## Forschung

[ECLA-VENT](#)  
[AutoMock](#)

## Lehre

WS2017/18:

- [Dynamic Systems for Computer Scientists \(V\)](#)
- [Cyber-Physische Systeme in Medizintechnik und Mobilität \(S\)](#)

WS2016/17:

- [Dynamic Systems for Computer Scientists \(V\)](#)
- [Eingebettete Software in Medizintechnik & eMobilität \(S\)](#)

SS2016:

- [Eingebettete Software in Medizintechnik & eMobilität \(S\)](#)

WS2015/16:

- [Dynamic Systems for Computer Scientists \(V\)](#)
- [Eingebettete Signalverarbeitung in Medizintechnik & eMobilität \(S\)](#)

WS2014/15:

- [Dynamic Systems for Computer Scientists \(V\)](#)
- [Ausgesuchte Themen zur Eingebetteten Software \(S\)](#)

WS2013/14:

- [Safe and Sound: Testing and Model Checking of Embedded Systems \(S\)](#)
- [Dynamic Systems for Computer Scientists \(V\)](#)

## Betreute Abschlussarbeiten

- [Eingebette Rezirkulationsmessung für ECLA-Systeme](#)
- [Editor und Steuerungsapplikation für pulsatile Blutflüsse](#)
- [Rezirkulationsmessung bei extrakorporaler Lungenunterstützung](#)
- [Auslegung einer pulsatilen Ansteuerungsstrategie für eine Blutpumpe](#)
- [Modellierung und Analyse von konkurrierenden Sicherheitszielen in einer intensivmedizinischen Anwendung](#)

## Publikationen

[WBK+23]

PDFBIB

Wiertalla, M., Berg, F. J., Kühn, J., Buglowski, M., Bleilevens, C., Kowalewski, S., and Stollenwerk, A., "A fully automated normothermic machine perfusion system for kidney grafts supporting physiological motivated flow profiles", in *Proc. Current directions in biomedical engineering*, Berlin, 2023, vol. 9, De Gruyter, pp. 323-326.

### **A fully automated normothermic machine perfusion system for kidney grafts supporting physiological motivated flow profiles**

#### **Bibtex entry :**

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@inproceedings { WBK+23,  
  author = { Wiertalla, Marc and Berg, Frederik Julius and K{"u}hn,  
  Jahn  
    and Buglowski, Mateusz and Bleilevens, Christian and  
    Kowalewski, Stefan and Stollenwerk, André },  
  title = { A fully automated normothermic machine perfusion system  
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    profiles },  
  booktitle = { Current directions in biomedical engineering },  
  publisher = { De Gruyter },  
  pages = { 323-326 },  
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  number = { 1 },  
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  address = { Berlin },
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    issn = { 2364-5504 },
    organization = { 57. DGBMT Annual Conference on Biomedical
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    typ = { PUB:(DE-HGF)16 },
    reportid = { RWTH-2023-09613 },
    cin = { 122810 / 120000 },
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    Entwicklung eines vollautomatisierten in vitro Teststands
    (Mock Loop) - Ein künstlicher Kreislauf als
    Ersatzmethode zur Biokompatibilitätstestung von
    Membranoxygenatoren und zur Transplantationssimulation
    (BMBF-031L0134B) },
}

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[WBO+23a]

[PDFBIB](#)

Wartalla, M. O., Berg, F. J., Ottersbach, F., Kühn, J., Buglowski, M., Kowalewski, S., and Stollenwerk, A., "A modular and verifiable software architecture for interconnected medical systems in intensive care", *Annals of computer science and information systems*, vol. 37, pp. 345-351, 2023

## A modular and verifiable software architecture for interconnected medical systems in intensive care

### Bibtex entry :

```

@article { WBO+23a,
  author = { Wartalla, Marc Oliver and Berg, Frederik Julius and
    Ottersbach, Florian and Kühn, Jan and Buglowski, Mateusz
    and Kowalewski, Stefan and Stollenwerk, André },
  title = { A modular and verifiable software architecture for
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  journal = { Annals of computer science and information systems },
  publisher = { Polish Information Processing Society },
  pages = { 345-351 },
  volume = { 37 },
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  organization = { 18. Conference on Computer Science and
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  doi = { 10.15439/2023F6208 },
  typ = { PUB:(DE-HGF)16 },
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  Membranoxygenatoren und zur Transplantationssimulation
  (BMBF-031L0134B) },
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[KBS+19]

[PDFBIB](#)

Kühn, J., Buglowski, M., Stollenwerk, A., Kowalewski, S., Walter, M., Leonhardt, S., Petran, J., Kopp, R., Rossaint, R., and Janisch, T., "Fault Identification in a Blood Pump Using Neural Networks", in *Proc. World Congress on Medical Physics and Biomedical Engineering 2018 : June 3-8, 2018, Prague, Czech Republic (Vol.2) / edited by Lenka Lhotska, Lucie Sukupova, Igor Lacković, Geoffrey S. Ibbott*, Singapore, 2019 in IFMBE Proceedings, Springer Singapore, pp. 27-32.

## Fault Identification in a Blood Pump Using Neural Networks

### Bibtex entry :

```
@inproceedings { KBS+19,
  author = { Kühn, Jan and Buglowski, Mateusz and Stollenwerk,
  André
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    Rolf and Janisch, Thorsten },
  title = { Fault Identification in a Blood Pump Using Neural
  Networks },
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    2018 : June 3-8, 2018, Prague, Czech Republic (Vol.2) /
    edited by Lenka Lhotska, Lucie Sukupova, Igor Lacković,
    Geoffrey S. Ibbott },
  publisher = { Springer Singapore },
  pages = { 27-32 },
  series = { IFMBE Proceedings },
  year = { 2019 },
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  organization = { IUPESM World Congress on Medical Physics and
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    2018-06-08 },
  doi = { 10.1007/978-981-10-9038-7_6 },
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  (Mock Loop) - Ein künstlicher Kreislauf als
  Ersatzmethode zur Biokompatibilitätstestung von
  Membranoxygenatoren und zur Transplantationssimulation
  (BMBF-031L0134B) },
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[KSK+18]

[PDFBIB](#)

Kühn, J., Stollenwerk, A., Kowalewski, S., Fabry, G., Grzanna, T., Doorschodt, B., Tolba, R. H., Rossaint, R., and Bleilevens, C., "A long-term setup for kidney perfusion." 2018.

## A long-term setup for kidney perfusion

### Bibtex entry :

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@inproceedings { KSK+18,
  author = { Kühn, Jan and Stollenwerk, André and Kowalewski,
Stefan
    and Fabry, Gregor and Grzanna, Tim and Doorschodt, Benedict
    and Tolba, René H. and Rossaint, Rolf and Bleilevens,
    Christian },
  title = { A long-term setup for kidney perfusion },
  year = { 2018 },
  organization = { 52. Annual Conference of the German Society for
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  (Mock Loop) - Ein künstlicher Kreislauf als
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  Membranoxygenatoren und zur Transplantationssimulation
  (BMBF-031L0134B) },
}

```

[SBK18]

[PDFBIB](#)

Stollenwerk, A., Buglowski, M., and Kühn, J., "Mock loop for bubble generation in a centrifugal blood pump for fault simulation", *Current Directions in Biomedical Engineering*, vol. 4, iss. 1, pp. 33-36, 2018

## Mock loop for bubble generation in a centrifugal blood pump for fault simulation

### Bibtex entry :

```
@article { SBK18,  
  author = { Stollenwerk, André and Buglowski, Mateusz and K{"u}hn,  
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  pages = { 33-36 },  
  volume = { 4 },  
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  address = { Berlin },  
  issn = { 2364-5504 },  
  doi = { 10.1515/cdbme-2018-0009 },  
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http://publications.rwth-aachen.de/record/752262/files/752262.pdf },  
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[WKJ+18]

[PDFBIB](#)

Walter, M., Kühn, J., Janisch, T., Petran, J., Kopp, R., and Leonhardt, S., "Cooperative automation of extracorporeal gas exchange and artificial ventilation", in *Proc. World Congress on Medical Physics & Biomedical Engineering : June 3-8, 2018, Prague, Czech Republic : IUPESM Pague 2018 : Book of Abstracts*, 2018, pp. 663-664.

## Cooperative automation of extracorporeal gas exchange and artificial ventilation

### Bibtex entry :

```
@inproceedings { WKJ+18,  
  author = { Walter, Marian and K{"u}hn, J. and Janisch, Thorsten  
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  Petran, Jan and Kopp, R{"u}dger and Leonhardt, Steffen },  
  title = { Cooperative automation of extracorporeal gas exchange and  
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  booktitle = { World Congress on Medical Physics & Biomedical  
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Book of Abstracts },
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url = { https://guarant.topinfo.cz/iupesm2018/en/book-of-abstracts
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[BHK+17]

[PDFBIB](#)

Brendle, C., Hackmack, K. -F., Kühn, J., Wardeh, M. N., Janisch, T., Kopp, R., Rossaint, R., Stollenwerk, A., Kowalewski, S., Leonhardt, S., Walter, M., and Misgeld, B. J. E., "Closed-loop control of extracorporeal oxygen and carbon dioxide gas transfer", *Control engineering practice*, vol. 59, pp. 173-182, 2017

## Closed-loop control of extracorporeal oxygen and carbon dioxide gas transfer

### Bibtex entry :

```

@article { BHK+17,
  author = { Brendle, Christian and Hackmack, K.-F. and K{"u}hn, Jan
and
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  title = { Closed-loop control of extracorporeal oxygen and carbon
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  journal = { Control engineering practice },
  publisher = { Elsevier Science },
  pages = { 173-182 },
  volume = { 59 },
  year = { 2017 },
  address = { Amsterdam [u.a.] },
  issn = { 0967-0661 },
  doi = { 10.1016/j.conengprac.2016.09.016 },
  typ = { PUB:(DE-HGF)16 },
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[BMK+17]

[PDFBIB](#)

Brendle, C., Mülders, T., Kühn, J., Janisch, T., Kopp, R., Rossaint, R., Stollenwerk, A., Kowalewski, S., Misgeld, B. J. E., Leonhardt, S., and Walter, M., "Physiological closed-loop control of mechanical ventilation and extracorporeal membrane oxygenation", *Biomedical engineering = Biomedizinische Technik*, vol. 62, iss. 2, pp. 199-212, 2017

## Physiological closed-loop control of mechanical ventilation and extracorporeal membrane oxygenation

**Bibtex entry :**

```
@article { BMK+17,  
  author = { Brendle, Christian and M{"u}lders, Thorsten and  
K{"u}hn,  
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  Rolf and Stollenwerk, André and Kowalewski, Stefan and  
  Misgeld, Berno Johannes Engelbert and Leonhardt, Steffen and  
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  volume = { 62 },  
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  url = { http://publications.rwth-aachen.de/record/707843 },  
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```

[DKK17]

[PDFBIB](#)

Dernehl, C., Kühn, J., and Kowalewski, S., "Case studies on automated verification with slope boundaries for block diagrams", *Computer Languages, Systems & Structures*, vol. 54, pp. 528-543, 2017

## Case studies on automated verification with slope boundaries for block diagrams

**Bibtex entry :**

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@article { DKK17,
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author = { Dernehl, Christian and K{"u}hn, Jan and Kowalewski,
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journal = { Computer Languages, Systems & Structures },
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pages = { 528-543 },
volume = { 54 },
year = { 2017 },
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[KBS+17]

[PDFBIB](#)

Kühn, J., Brendle, C., Stollenwerk, A., Schweigler, M., Kowalewski, S., Janisch, T., Rossaint, R., Leonhardt, S., Walter, M., and Kopp, R., "Decentralized safety concept for closed-loop controlled intensive care : Supervision of a blood pump during extracorporeal circulation", *Biomedical engineering = Biomedizinische Technik*, vol. 62, iss. 2, pp. 213-224, 2017

## Decentralized safety concept for closed-loop controlled intensive care : Supervision of a blood pump during extracorporeal circulation

### Bibtex entry :

```

@article { KBS+17,
author = { K{"u}hn, Jan and Brendle, Christian and Stollenwerk,
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Walter, Marian and Kopp, R{"u}dger },
title = { Decentralized safety concept for closed-loop controlled
intensive care : Supervision of a blood pump during
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journal = { Biomedical engineering = Biomedizinische Technik },
publisher = { de Gruyter },
pages = { 213-224 },
volume = { 62 },
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url = { http://publications.rwth-aachen.de/record/707857 },  
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[WKK+17]

[PDFBIB](#)

Walter, M., Kunczik, J., Kühn, J., Janisch, T., Kopp, R., and Leonhardt, S., "Robust control of extracorporeal gas exchange", in *Proc. Abstract Book at EMBEC'17 & NBC'17 : the Joint conference of the European Medical and Biological Engineering Conference (EMBEC) and the Nordic-Baltic Conference on Biomedical Engineering and Medical Physics (NBC) : Tampere, Finland / Editors: Jennika Karvinen, Janne Koivisto, Sampo Tuukkanen, Jari Viik*, Finland, 2017, BioMediTech Institute and Faculty of Biomedical Sciences and Engineering Tampere University of Technology, p. 365, 150-150.

## Robust control of extracorporeal gas exchange

### Bibtex entry :

```
@inproceedings { WKK+17,  
  author = { Walter, Marian and Kunczik, Janosch and K{"u}hn, Jan  
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Steffen },  
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conference of  
  the European Medical and Biological Engineering Conference  
(EMBEC) and the Nordic-Baltic Conference on Biomedical  
Engineering and Medical Physics (NBC) : Tampere, Finland /  
Editors: Jennika Karvinen, Janne Koivisto, Sampo Tuukkanen,  
Jari Viik },  
  publisher = { BioMediTech Institute and Faculty of Biomedical  
Sciences and  
  Engineering Tampere University of Technology },  
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Conference on Biomedical Engineering and Medical Physics  
(NBC), Tampere (Finland), 2017-06-11 - 2017-06-15 },  
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[BHK+16]

PDFBIB

Brendle, C., Hackmack, K. -F., Kühn, J., Wardeh, M. N., Janisch, T., Kopp, R., Rossaint, R., Stollenwerk, A., Kowalewski, S., Misgeld, B. J. E., Leonhardt, S., and Walter, M., "Continuous gas transfer monitoring during extracorporeal membrane oxygenation", *Biomedical signal processing and control*, vol. 31, pp. 321-330, 2016

## Continuous gas transfer monitoring during extracorporeal membrane oxygenation

**Bibtex entry :**

```
@article { BHK+16,
  author = { Brendle, Christian and Hackmack, K.-F. and K{"u}hn, Jan
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  journal = { Biomedical signal processing and control },
  publisher = { Elsevier },
  pages = { 321-330 },
  volume = { 31 },
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  doi = { 10.1016/j.bspc.2016.08.023 },
  typ = { PUB:(DE-HGF)16 },
  reportid = { RWTH-2016-10177 },
  cin = { 611010 / 122810 / 120000533000-2 },
  url = { http://publications.rwth-aachen.de/record/678132 },
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[DKK16]

PDFBIB

Dernehl, C., Kühn, J., and Kowalewski, S., "Abstract Interpretation for Block Diagrams : Two Case Studies", in *Proc. MoDeVva 2016 : Model-Driven Engineering, Verification and Validation : proceedings of the 13th Workshop on Model-Driven Engineering, Verification and Validation co-located with ACM/IEEE 19th International Conference on Model Driven Engineering Languages and Systems (MODELS 2016) : Saint-Malo, France, October 3, 2016 / edited by Michalis Famelis, Daniel Ratiu, Gehan M. K. Selim, Aachen, Germany, 2016* in CEUR workshop proceedings, RWTH Aachen, pp. 20-29.

## Abstract Interpretation for Block Diagrams : Two Case Studies

## Bibtex entry :

```
@inproceedings { DKK16,  
  author = { Dernehl, Christian and K{"u}hn, Jan and Kowalewski,  
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Validation : proceedings of the 13th Workshop on  
Model-Driven Engineering, Verification and Validation  
co-located with ACM/IEEE 19th International Conference on  
Model Driven Engineering Languages and Systems (MODELS 2016)  
: Saint-Malo, France, October 3, 2016 / edited by Michalis  
Famelis, Daniel Ratiu, Gehan M. K. Selim },  
  publisher = { RWTH Aachen },  
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[KSB+16]

[PDFBIB](#)

Kühn, J., Stollenwerk, A., Brendle, C., Janisch, T., Walter, M., Rossaint, R., Leonhardt, S., Kowalewski, S., and Kopp, R., "Sensor Supervision and Control Value Limitations in Networked Intensive Care", in *Proc. [Gemeinsamer Tagungsband der Workshops der Tagung Software Engineering 2016 (SE-WS 2016), Wien, 23.-26. Februar 2016 / Edited by: Wolf Zimmermann, Lukas Alperowitz, Bernd Brügge, Jörn Fahsel, Andrea Herrmann, Anne Hoffmann, Andreas Krall, Dieter Landes, Horst Lichter, Dirk Riehle, Ina Schaefer, Constantin Scheuermann, Alexander Schlaefer, Sibylle Schupp, Andreas Seitz, Andreas Steffens, André Stollenwerk, Rüdiger Weißbach]*, Aachen, Germany, 2016 in CEUR Workshop Proceedings, RWTH Aachen, pp. 187-194.

## Sensor Supervision and Control Value Limitations in Networked Intensive Care

### Bibtex entry :

```
@inproceedings { KSB+16,  
  author = { K{"u}hn, Jan and Stollenwerk, André and Brendle,  
Christian  
and Janisch, Thorsten and Walter, Marian and Rossaint, Rolf
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and Leonhardt, Steffen and Kowalewski, Stefan and Kopp,
R{"u}dger },
title = { Sensor Supervision and Control Value Limitations in
Networked Intensive Care },
booktitle = { [Gemeinsamer Tagungsband der Workshops der Tagung
Software
Engineering 2016 (SE-WS 2016), Wien, 23.-26. Februar 2016 /
Edited by: Wolf Zimmermann, Lukas Alperowitz, Bernd
Br{"u}gge, J{"o}rn Fahsel, Andrea Herrmann, Anne Hoffmann,
Andreas Krall, Dieter Landes, Horst Lichter, Dirk Riehle,
Ina Schaefer, Constantin Scheuermann, Alexander Schlaefer,
Sibylle Schupp, Andreas Seitz, Andreas Steffens, André
Stollenwerk, R{"u}diger Wei{\ss}bach] },
publisher = { RWTH Aachen },
pages = { 187-194 },
series = { CEUR Workshop Proceedings },
year = { 2016 },
address = { Aachen, Germany },
organization = { 2. Workshop on Fail Safety in Medical Cyber-
Physical
Systems, Wien (Austria), 2016-02-26 - 2016-02-26 },
typ = { PUB:(DE-HGF)8 },
reportid = { RWTH-CONV-207901 },
cin = { 122810 / 120000 / 611010 / 9210120533000-2 },
url = { http://ceur-ws.org/Vol-1559/paper25.pdf },
illkey = { DFG project 224967929 - Kooperierende Regelung von
extrakorporaler Lungenunterst{"u}tzung und Beatmung f{"u}r
die Therapie des Lungenversagens (ECLA-VENT) (224967929) },
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[KVS+16]

[PDFBIB](#)

Kühn, J., Vaitl, L., Stollenwerk, A., Brendle, C., Walter, M., Leonhardt, S., Kowalewski, S., Rossaint, R., Kopp, R., and Janisch, T., "Eingebettete Rezirkulationsmessung für eine ECLA-Therapie", in *Proc. AUTOMED 2016 : Workshop : Wismar, 22.-23. September 2016 / DGBMT - Deutsche Gesellschaft für Biomedizinische Technik im VDE ; Editoren: Prof. Dr.-Ing. habil. Olaf Simanski, Dr. Olaf Hagendorf, Jörg Zucknik, Wismar, 2016, Hochschule Wismar, Fakultät für Ingenieurwissenschaften, Fachgebiet Automatisierungstechnik/Mechatronik*, p. 2.

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### Bibtex entry :

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@inproceedings { KVS+16,
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[WBK+16]

[PDFBIB](#)

Walter, M., Brendle, C., Kühn, J., Janisch, T., Kopp, R., Stollenwerk, A., and Leonhardt, S., "Assistive Control of Extracorporeal Oxygenation Systems", in *Proc. Proceedings of the 12th Russian-German Conference on Biomedical Engineering : 04-07 Jul 2016, Suzdal, Russia*, Suzdal, 2016, Vladimir state univ. named after Alexandr and Nikolay Stoletovs, pp. 222-226.

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### Bibtex entry :

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@inproceedings { WBK+16,
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```

[BHK+15]

[PDFBIB](#)

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### Bibtex entry :

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@article { BHK+15,
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[KSB+15]

[PDFBIB](#)

Kühn, J., Stollenwerk, A., Brendle, C., Walter, M., Wardeh, M. N., Kopp, R., and Kowalewski, S., "Embedded Safety Measures for Extracorporeal Blood Circulation", in *Proc. [Proceedings of the 11th German-Russian-Conference on Biomedical Engineering, GRC, 17.06.2015-19.06.2015, Aachen, Germany]*, 2015, pp. 169-170.

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### Bibtex entry :

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@inproceedings { KSB+15,
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[KSK+15]

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@article { KSK+15,
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author = { K{"u}hn, Jan and Stollenwerk, André and Kowalewski,
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[KSS+15]

[PDFBIB](#)

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[KWS+15]

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[SKW+15]

[PDFBIB](#)

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### Bibtex entry :

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}

[SKB+14]

[PDFBIB](#)

Stollenwerk, A., Kühn, J., Brendle, C., Walter, M., Arens, J., Wardeh, M. N., Kowalewski, S., and Kopp, R., "Model-based supervision of a blood pump", in *Proc. Proceedings of the 19th World Congress of the International Federation of Automatic Control, Cape Town, South Africa, 2014, 24-29 August 2014 : Promoting automatic control for the benefit of humankind*, Laxenburg, 2014 in IFAC-PapersOnLine, IFAC, pp. 6593-6598.

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### Bibtex entry :

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@inproceedings { SKB+14,
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