DECHEMA
Gesellschaft für Chemische Technik
und Biotechnologie e.V.

PROGRAMME

15 – 17 November 2021 · Online Event

EuroPACT 2021

5th European Conference on Process Analytics and Control Technology

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europact 2021

arbeitskreis prozessanalytik

GDCh

CPACT
CENTRE FOR PROCESS ANALYTICS AND CONTROL TECHNOLOGY

APACT

Monday, 15. November 2021

Plenary Room

13:00	**Interactive nanoPAT Workshop** (13:00 – 16:00)
16:15	**CONFERENCE OPENING** Tobias Eifert, Covestro Deutschland AG, Leverkusen/D; Christoph Herwig, TU Wien/AT
16:25	**IT introduction and platform usage and Introduction to Exhibition**
	Chair: T. Eifert, Covestro Deutschland AG, Leverkusen/D
16:30	**PLENARY LECTURE** **From data to knowledge: Follow the Eight-Fold Path!** A. Bilgic[1]; [1] KROHNE, Duisburg/D
17:30	**PAT Training Session** Frans van den Berg (University of Copenhagen, DK) (17:30 – 18:30)

Tuesday, 16. November 2021

Plenary Room

09:00 **WELCOME**
T. Eifert, Covestro Deutschland AG, Leverkusen/D

09:15 **IT introduction and platform usage**

Keynote Session

Chair: T. Eifert, Covestro Deutschland AG, Leverkusen/D

09:20 **Process Analytics in Pharmaceutical and Biopharmaceutical industry**
E. Skibsted[1]; [1] Novo Nordisk A/S, Måløv/DK

09:50 **The role of Data in Process Control: Modeling, Monitoring and Optimization**
A. Mitsos[1]; [1] RWTH Aachen, Aachen/D

10:20 Coffee Break

Room 1

Process Analysis in Real-Worl Manufacturing

Chair: M. Grosso, University of Cagliari/IT

10:50 **In-line Polymer Identification in Continuous Process based on Spectroscopy ans Machine Learning Models**
S. Montagnier[1]; J. Lallemand-Poulain[2]; P. Hebert[1]; J. Guilment[1]; S. Roussel[2]; [1] Arkema, Serquigny/F; [2] Ondalys, Clapiers/F

11:15 **Twin Screw Wet Granulation Pharmaceutics Formulation Platform for Process Development and Metrological Studies**
S. Matrali[1]; R. Findlay[1]; J. Andrews[1]; M. Zhang[1]; T. Addison[1]; D. Parmley[1]; S. Chauruka[1]; J. Hill[1]; J. Yan[1]; E. Lopez Montero[2]; M. Matei-Rascu[2]; J. Mack[2]; M. De Matas[1]; C. Kelly[1]; D. Berry[1]; S. Sharma[1]; M. Taylor[1]; [1] CPI - Centre for Process Innovation, Sedgefield, County Durham, United Kingdom/UK; [2] Perceptive Engineering Limited, Cheshire/UK

11:40 **A multi-technique approach for the characterization and in situ monitoring of complex crystallization processes**
E. Simone[1]; M. Povey[1]; J. Webb[2]; N. George[2]; J. Hone[2]; [1] University of Leeds, Leeds/UK; [2] Syngenta Jealott's Hill International Research Centre, Bracknell/UK

12:05 **Verification, validation and inter technique comparison of different PAT tools in the size reduction of particles to the nanometre range**
S. Ward-Smith[1]; A. Ryder[2]; N. Meulendijks[3]; C. Malde[4]; B. Wuytens[5]; N. Al Rifai[6]; A. Gerich[7]; C. Janzen[8]; A. Stewart[9]; [1] Malvern Panalytical, Malvern/UK; [2] Nanoscale Biophotonics Laboratory, School of Chemistry, National University of Ireland - Galway, Galway/IRL; [3] TNO, Eindhoven/NL; [4] Johnson Matthey, Reading/UK; [5] Agfa-Gevaert, Mortsel/B; [6] Janssen, Beerse/B; [7] In Process LSP, Oss/NL; [8] Fraunhofer ILT, aachen/D; [9] University of Limerick, Limerick/IRL

Plenary Room

12:40 Virtual Lunch Session

13:30 **POSTER SHORT PRESENTATIONS**

15:30 **EuroPACT Speed Dating (3x 10 min shuffled meetings)**

Keynote Session

Chair: T. Eifert, Covestro Deutschland AG, Leverkusen/D

16:00 **The Automation Ecosystem: considerations for Implementing PAT in the factory**
C. Kradjel[1]; [1] Axis NJ/Power-Flo Technologies/US

16:30 **Feedback as a means to cope with model deficiencies: the need for measurement information**
S. Engell[1]; [1] TU Dortmund , Dortmund/D

17:00 Coffee Break – walk-in to the vendors

Room 1

Novel Process Analysis Technologies I

Chair: A. Nordon, University of Strathclyde/CPACT/UK

17:15 **Real-time monitoring of blending processes using in situ NIR hyperspectral imaging and variographic image analysis**
R. Rocha de Oliveira[1]; A. Juan Capdevila[1]; [1] Universitat de Barcelona, Barcelona/E

17:40 **3D-Raman-photometry for concentration mapping in falling films**
M. Nachtmann[1]; M. Rädle[1]; S. Scholl[2]; [1] University of Applied Sciences Mannheim/D; [2] Technical University Braunschweig/D

18:05 **TG-PRORAM: Time-Gated Raman Spectroscopy for the Process Industry**
T. Fritsch[1]; J. Tebrügge[1]; J. Förster[1]; P. Wacker[1]; J. Rüger[2]; I. Schie[2]; K. Weber[2]; J. Popp[2]; J. Ohrem[3]; E. Ostertag[4]; B. Boldrini[4]; K. Rebner[4]; H. Prüfer[5]; [1] KROHNE Innovation GmbH, Duisburg/D; [2] Leibniz Institute for Photonic Technology, Jena/D; [3] KHS GmbH, Bad Kreuznach/D; [4] Reutlingen University, Reutlingen/D; [5] SensoLogic GmbH, Norderstedt/D

18:30 **Closing** (18:30 – 18:45)

Tuesday, 16. November 2021

Plenary Room

09:00 **WELCOME**
T. Eifert, Covestro Deutschland AG, Leverkusen/D

09:15 **IT introduction and platform usage**

Keynote Session

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09:20 **Process Analytics in Pharmaceutical and Biopharmaceutical industry**
E. Skibsted[1]; [1] Novo Nordisk A/S, Måløv/DK

09:50 **The role of Data in Process Control: Modeling, Monitoring and Optimization**
A. Mitsos[1]; [1] RWTH Aachen, Aachen/D

10:20 Coffee Break

Room 2

Process Model Lifecycling

Chair: C. Herwig, TU Wien/AT

10:50 **The power of contextual information in soft sensor-based process improvement**
F. Souza[1]; T. Offermans[1]; S. Yong Teng[1]; G. Postma[1]; J. Jansen[1]; [1] Radboud University, Nijmegen/NL

11:15 **Kalman Filter-based soft sensors for biomass, glucose and acetate in parallel Escherichia coli mini-bioreactor fed-batch fermentations**
A. Kemmer[1]; N. Fischer[1]; T. Wilms[1]; S. Hans[1]; R. King[1]; P. Neubauer[1]; M. Cruz-Bournazou[1]; [1] Technische Universität Berlin/D

11:40 **The development and usage of mechanistic models in biotechnology**
J. Kager[1]; P. Sinner[2]; S. Daume[2]; J. Bartlechner[2]; F. Müller[2]; C. Herwig[2]; [1] Competence Center CHASE GmbH, Wien/A; [2] TU Wien/A

12:05 **Distributed Environment Supporting the Rapid Development and Deployment of Process Models (Soft Sensors)**
I. Whitehead[1]; D. Geier[1]; T. Becker[1]; [1] TU München, Lehrstuhl für Brau- und Getränketechnologie, Freising/D

Plenary Room

12:40 Virtual Lunch Session

13:30 **POSTER SHORT PRESENTATIONS**
Chair: F. van den Berg, University of Copenhagen/DK

15:30 **EuroPACT Speed Dating (3 x 8 min shuffled meetings)**
Chair: W. Worringen, Yokogawa/D

Keynote Session

Chair: T. Eifert, Covestro Deutschland AG, Leverkusen/D

16:00 **Title tba**
C. Kradjel [1]; [1] Axis NJ/Power-Flo Technologies/US

16:30 **The role of Data in Process Control: Modeling, Monitoring and Optimization**
S. Engell[1]; [1] TU Dortmund , Dortmund/D

17:00 Coffee Break – walk in to the exhibitors/sponsors

Room 2

Process Control & Optimization

Chair: M. Maiwald, BAM, Berlin/D

17:15 **Evaluation of the fouling potential of reverse osmosis feed water by Machine Learning methods and spectroscopic measurements**
M. Weirich[1]; F. Blauth[2]; S. Antonyuk[1]; [1] TU Kaiserslautern/D; [2] Institute for Energy and Environmental Technology e.V., Duisburg/D

17:40 **Process monitoring and control of polyhydroxyalkanoate production by photon density wave spectroscopy**
B. Gutschmann[1]; T. Schiewe[2]; L. Aulich[1]; P. Neubauer[1]; R. Hass[3]; M. Münzberg[2]; S. Riedel[1]; [1] Technische Universität Berlin, Berlin/D; [2] innoFSPEC Potsdam Universität Potsdam - Physikalische Chemie, Potsdam/D; [3] PDW Analytics GmbH, Potsdam/D

18:05 **Advanced Process Control Concept for Continuous API Synthesis**
S. Sacher[1]; I. Castillo[2]; J. Rehrl[1]; P. Sagmeister[1]; J. Williams[1]; J. Kruisz[1]; R. Lebl[1]; S. Celikovic[1]; M. Sipek[3]; C. Kappe[4]; M. Horn[2]; D. Kirschneck[5]; J. Khinast[1]; [1] Research Center Pharmaceutical Engineering GmbH, Graz/A; [2] Graz University of Technology, Graz/A; [3] evon GmbH, St. Ruprecht a. d. Raab/A; [4] University of Graz, Graz/A; [5] Microinnova Engineering GmbH, Allerheiligen bei Wildon/A

18:30 **Closing** (18:30 – 18:45)

Wednesday, 17. November 2021

Plenary Room

09:00 **WELCOME**

Keynote Session

Chair: T. Eifert, Covestro Deutschland AG, Leverkusen/D

09:15 **Advances in QCL for PAT**
B. Lendl[1]; [1] TU Wien/AT

09:45 **Spatially Resolved Spectroscopy in Industry 4.0: the asset of multipoint measurements?**
D. Brouckaert[1]; [1] Indatech Chauvin Arnaux, Clapiers/F

10:15 Coffee Break

Room 1

Novel Process Analysis Technologies II

Chair: F. van den Berg, University of Copenhagen/DK

10:50 **Non-invasive real-time bioprocess monitoring enabled by cost-efficient near-infrared microspectrometers**
M. Brandstetter[1]; R. Zimmerleiter[1]; J. Kager[2]; R. Nikzad-Langerodi[1]; V. Berezhinskiy[2]; F. Westad[3]; C. Herwig[2]; [1] RECENDT - Research Center for Non Destructive Testing GmbH, Linz/A; [2] TU Wien, Wien/A; [3] Camo Analytics, Oslo/N

11:15 **Low cost near infrared spectroscopy for real time process control**
M. Rey-Bayle[1]; S. Giroud[1]; J. Gornay[1]; [1] IFP Energies nouvelles (IFPEN), Solaize/F

11:40 **Optofluidic Force Induction Scheme for the Characterization of Nanoparticle Ensembles**
M. Šimić[1]; G. Prossliner[2]; U. Hohenester[3]; C. Hill[2]; R. Prassl[4]; [1] University of Graz/Brave Analytics GmbH, Graz/A; [2] Medical University of Graz/Brave Analytics GmbH, Graz/A; [3] University of Graz, Graz/A; [4] Medical University of Graz, Graz/A

12:05 **Modular process control with compact NMR spectroscopy: From field integration to automated data analysis**
K. Meyer[1]; S. Kern[1]; S. Guhl[1]; M. Bornemann-Pfeiffer[1]; L. Wander[1]; S. Kowarik[1]; S. Liehr[1]; M. Maiwald[1]; [1] Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin/D

Plenary Room

12:30 Virtual Lunch Session

13:30 **Exhibitor/Sponsor Short Presentations**

Room 1

14:30 **Discussion Rounds**

Plenary Room

Keynote Session

Chair: T. Eifert, Covestro Deutschland AG, Leverkusen/D

15:30 **Smart PAT: shifting quality control to the shop floor**
C. Caminada[1]; [1] Hamilton Bonaduz AG , Bonaduz/CH

16:00 **Smart Equipment**
L. Urbas[1]; [1] Technische Universität Dresden, Dresden/D

16:30 Coffee Break – walk in to the exhibitors/sponsors

Room 1

Novel Process Analysis Technologies III

Chair: A. Nordon, University of Strathclyde/CPACT/UK

16:55 **On-line glucose monitoring in fermentation processes using electrochemical biosensor**
A. Hasanzadeh[1]; B. Rezaei[1]; H. Junicke[1]; M. Kilstrup[1]; K. Gernaey[1]; [1] Technical University of Denmark, Lyngby/DK

17:20 **Completely Non-Invasive pH-Monitoring in Bioprocesses using Good's Buffers and Raman Spectroscopy**
D. Müller[1]; C. Flake[1]; T. Brands[1]; L. Bahr[1]; H. Koß[1]; [1] RWTH-Aachen University, Aachen/D

18:00 **POSTER PRIZE / CLOSING**
Tobias Eifert (Covestro,DE), Frans van den Berg (University of Copenhagen, DK)(18:00 – 18:15)

Wednesday, 17. November 2021

Plenary Room

09:00 **WELCOME**

Keynote Session

Chair: T. Eifert, Covestro Deutschland AG, Leverkusen/D

09:15 **Advances in QCL for PAT**
B. Lendl[1]; [1] TU Wien/AT

09:45 **Spatially Resolved Spectroscopy in Industry 4.0: the asset of multipoint measurements?**
D. Brouckaert[1]; [1] Indatech Chauvin Arnaux, Clapiers/F

10:15 Coffee Break

Room 2

Advances in Process Monitoring I

Chair: S. Roussel, Ondalys/FR

10:50 **Raman spectroscopy for online monitoring of a homogeneous hydroformylation process in microemulsion**
A. Paul[1]; D. Töpfer[2]; J. Ruiken[3]; M. Illner[3]; E. Esche[3]; J. Repke[3]; M. Maiwald[1]; K. Meyer[1]; [1] BAM - Bundesanstalt für Materialforschung und -prüfung, Berlin/D; [2] BAM - Bundesanstalt für Materialforschung und -prüfung & Humboldt-Universität zu Berlin, Berlin/D; [3] Technische Universität Berlin, Berlin/D

11:15 **Inline concentration monitoring of dissociated carboxylic acids**
A. Echtermeyer[1]; M. Gausmann[2]; C. Marks[1]; A. Mitsos[1]; A. Jupke[2]; J. Viell[1]; [1] Process Systems Engineering (AVT.SVT), RWTH Aachen University, Aachen/D; [2] Fluid Process Engineering (AVT.FVT), RWTH Aachen University, Aachen/D

11:40 **Automated online flow cytometry as a tool for real-time bioprocesses monitoring**
K. Schiessl[1]; K. Schiessl[1]; M. Besmer[1]; [1] onCyt Microbiology AG, Zurich/CH

12:05 **Supervised and unsupervised online monitoring of emulsion polymerization by spectroscopy**
M. Gheghiani[1]; N. Caillol[1]; S. Henrot[1]; T. McKenna[2]; N. Sheibat-Othman[3]; [1] Axel'one, Solaize/F; [2] C2P2/University of Claude Bernard Lyon 1, Villeurbanne/F; [3] LAGEPP/University of Claude Bernard Lyon 1, Villeurbanne/F

Plenary Room

12:30 Virtual Lunch Session

13:15 **PAT AWARD** sponsored by SIEMENS

13:30 **Vendor Short Presentations**

Room 2

14:30 **Student Meet & Greet**

Plenary Room

Keynote Session

Chair: T. Eifert, Covestro Deutschland AG, Leverkusen/D

15:30 **Smart PAT: shifting quality control to the shop floor**
C. Caminada[1]; [1] Hamilton Bonaduz AG , Bonaduz/CH

16:00 **Smart Equipment**
L. Urbas[1]; [1] Technische Universität Dresden, Dresden/D

16:30 Coffee Break - walk-in to the vendors

Room 2

Advances in Process Monitoring II

Chair: A. de Juan Capdevila, University of Barcelona/ES

16:30 **Bayesian Method for Automated Quantitative Analysis of Benchtop NMR Data**
E. Steimers[1]; Y. Matviychuk[2]; K. Münnemann[1]; D. Holland[2]; E. von Harbou[1]; [1] Technische Universität Kaiserslautern, Kaiserslautern/D; [2] University of Canterbury, Christchurch/NZ

16:55 **Chemical Quality Prediction by Inversing Dynamic PLSMAR: Balancing Interpretability and Accuracy**
S. Teng[1]; T. Offermans[1]; F. Souza[1]; G. Postma[1]; J. Jansen[1]; [1] Radboud University, IMM , Nijmegen/NL

17:20 **From complex real-world data to process understanding and monitoring, a use case in the chemical industry**
S. Preys[1]; A. Zenner[2]; F. Gaulier[2]; M. Davezac[2]; [1] Ondalys, Clapiers/F; [2] Elkem Silicones, St Fons/F

18:00 **POSTER PRIZE / CLOSING**
Tobias Eifert (Covestro,DE), Frans van den Berg (University of Copenhagen, DK)(18:00 – 18:15)

POSTER

P2 **Next generation of in situ reaction monitoring through extended fiber optics using mid-infrared dual comb spectroscopy**
F. Eigenmann[1]; R. Horvath[1]; A. Daly[2]; [1] IRsweep, Stäfa/CH; [2] Pfizer, Ringaskiddy, Cork/IRL

P3 **Industrial Applications of Low-Field NMR Spectroscopy for Process and Quality Control of Silanes**
K. Meyer[1]; M. Abele[2]; S. Falkenstein[2]; Y. Friedrich[2]; S. Kern[3]; K. Korth[2]; M. Maiwald[1]; [1] Bundesanstalt für Materialforschung und –prüfung (BAM), Berlin/D; [2] Evonik Resource Efficiency GmbH, Rheinfelden/D; [3] S-PACT GmbH, Aachen/D

P4 **Analysis of high solid polymer dispersions by Photon Density Wave spectroscopy**
S. Schlappa[1]; M. Münzberg[1]; O. Reich[1]; L. Bressel[1]; [1] University of Potsdam, Germany, Potsdam/D

P 5 **Inline Monitoring of Zeolite Synthesis by Photon Density Wave Spectroscopy**
D. Emmanouilidou[1]; [1] Zurich University of Applied Sciences ZHAW, Wädenswil/CH

P6 **Inline Monitoring of Wet-Milling Processes by Photon Density Wave Spectroscopy**
O. Pauli[1]; [1] Zurich University of Applied Sciences ZHAW, Wädenswil/CH

P 7 **A concept of wireless product and environmental monitoring in industrial production lines**
R. Ahlers[1]; T. Schäfer[2]; M. Rädle[2]; [1] ProxiVision GmbH, Bensheim/D; [2] Mannheim University of Applied Science, Mannheim/D

P8 **NIR-based inline measurement of formaldehyde in a resin production plant using cost-efficient microspectrometer technology**
R. Zimmerleiter[1]; T. Reischer[2]; A. Lang[2]; M. Roßbory[3]; M. Brandstetter[1]; [1] RECENDT - Research Center for Non Destructive Testing GmbH, Linz/A; [2] Metadynea Austria GmbH, Krems/A; [3] Software Competence Center Hagenberg, Hagenberg/A

P 9 **User-independent Nonlinear Modeling using Adjusted Spline-interpolated Knots (UNMASK) and Indirect Hard Modeling for the quantitative analysis of mixture-spectra with complex backgrounds**
J. Wöhl[1]; I. Oleksiyuk[2]; L. Bahr[2]; H. Koß[2]; [1] RWTH Aachen Universität, Aachen/D; [2] RWTH Aachen, Aachen/D

P 10 **Near-infrared Spatially Resolved Spectroscopy (NIR-SRS) for on-line monitoring and viscosity prediction during the peptization of boehmite suspensions**
N. Caillol[1]; M. Zapanta[1]; F. Baco-Antoniali[1]; D. Lofficial[2]; B. Cottin[2]; M. Rey-Bayle[2]; S. Lacombe[2]; [1] Axel'one, Solaize/F; [2] IFP Energies nouvelles (IFPEN), Solaize/F

P11 **ATR-InfraRed Spectroscopy for on-line monitoring of a batch hydrogenation reaction for process control and by-product detection.**
N. Caillol[1]; N. Fitriani[1]; F. Baco-Antoniali[1]; M. Gourraud[2]; S. Janvier[2]; [1] Axel'one, Solaize/F; [2] Servier, Bolbec/F

P 12 **Microsecond resolved infrared dual-comb spectroscopy on non-repetitive protein reactions by applying caged-compounds.**
F. Eigenmann[1]; R. Horvath[1]; C. Kötting[2]; K. Gerwert[2]; [1] IRsweep, Stäfa/CH; [2] Ruhr University Bochum, Bochum/D

P13 **From fed-batch to perfusion: Transferable glucose soft-sensor based on oxygen uptake rates of mammalian cells**
M. Pappenreiter[1]; C. Zabik[1]; W. Sommeregger[1]; G. Striedner[2]; A. Jungbauer[2]; B. Sissolak[1]; [1] Bilfinger Industrietechnik Salzburg GmbH, Vienna/A; [2] University of Natural Resources and Life Sciences (BOKU), Vienna/A

P 14 **Process monitoring of phytoplankton in the Meuse River for water quality control**
G. Tinnevelt[1]; O. Lushchikova[1]; M. Lochs[1]; D. Augustijn[1]; R. Geertsma[2]; M. Rijkeboer[2]; H. Kools[3]; G. Dubelaar[3]; A. Veen[2]; L. Buydens[1]; J. Jansen[1]; [1] Radboud University, Nijmegen/NL; [2] Rijkswaterstaat, Lelystad/NL; [3] Cytobuoy, Woerden/NL

P 15 **QbD/PAT: moving from lab-scale analytics to their application in food and food-focused biotechnology industries**
C. Pérez Beltrán[1]; A. Jiménez Carvelo[1]; A. Torrente López[2]; N. Navas Iglesias[2]; L. Cuadros Rodríguez[2]; [1] University of Granada, Granada/E; [2] University of Granada/Biohealth Research Institute (ibs.GRANADA), University of Granada, Spain, Granada/E

P 16 **Accelerating Process Development by Knowledge Transfer**
M. von Stosch[1]; M. Cruz Bournazou[2]; M. Sokolov[2]; A. Butté[1]; [1] DataHow AG, Dübendorf/CH; [2] DataHow AG, Zurich/CH

P 17 **Digital tools for the optimization of real time process analytics and control technologies**
S. Matrali[1]; R. Findlay[1]; J. Andrews[1]; A. Stobo[1]; K. Potter[2]; M. Zhang[1]; J. Hill[1]; J. Yan[1]; E. Lopez Montero[3]; M. Matei-Rascu[3]; J. Mack[3]; D. Berry[1]; S. Sharma[1]; M. Taylor[1]; [1] CPI - Centre for Process Innovation, Sedgefield, County Durham, United Kingdom/UK; [2] CPI - Centre for Process Innovation, Wilton, Redcar, United Kingdom/UK; [3] Perceptive Engineering Limited, Cheshire/UK

P 18 **Soft Sensors: Maximising the Benefits of PAT Data**
J. Andrews[1]; R. Findlay[1]; S. Matrali[1]; M. Zhang[1]; J. Yan[1]; C. Smith[1]; D. Parmley[1]; M. McEwan[2]; S. Williams[1]; S. Sharma[1]; [1] CPI - Centre for Process Innovation, Sedgefield/UK; [2] Perceptive Engineering Limited, Daresbury/UK

P 19 **Using the full potential of your PLS for validating your inline spectroscopy results.**
A. Olive[1]; S. Hakelberg[2]; [1] MPA, Schiedam/NL; [2] Deutsche METROHM Prozessanalytik GmbH & Co. KG, Filderstadt/D

P 20 **Advanced Real-Time Process Analytics for Multistep API Synthesis in Continuous Flow**
P. Sagmeister[1]; R. Lebl[1]; S. Kern[2]; C. Minnich[2]; J. Williams[1]; C. Kappe[1]; [1] University of Graz / Research Center Pharmaceutical Engineering (RCPE), Graz/A; [2] S-PACT GmbH, Aachen/D

P 21 **Multiple Line Analytics for the Control of Industrial Chemical Processes Using Online Mass Spectrometry**
I. Schmidt[1]; S. Neumann[1]; [1] InProcess Instruments GmbH, Bremen/D

P 22 **Monitoring of a carboxylic acid fermentation employing in-situ Raman spectroscopy**
J. Hofstede[1]; P. Niehoff[2]; J. Büchs[2]; J. Viell[1]; A. Mitsos[1]; [1] Process Systems Engineering (AVT.SVT), RWTH Aachen University, Aachen/D; [2] Biochemical Engineering (AVT.BioVT), RWTH Aachen University, Aachen/D

P 23 **Improved understanding of industrial process relationships through conditional path modelling with Process PLS**
T. Offermans[1]; J. Jansen[1]; [1] Radboud University, Nijmegen/NL

P 24 **Applications of In-line Raman Spectroscopy to Monitor Bioreactor in Biopharmaceutical Manufacturing**
F. Carruzzo[1]; [1] Merck, Corsier-sur-Vevey /CH

P 25 **Transfer of In-line Raman Spectroscopy in Precipitation Polymerization from Batch to Flow Reactor**
L. Kaven[1]; H. Wolff[2]; L. Wille[1]; M. Wessling[2]; A. Mitsos[1]; J. Viell[1]; [1] Process Systems Engineering, RWTH Aachen, Aachen/D; [2] Chemical Process Engineering, RWTH Aachen, Aachen/D

P 26 **Rapid Reaction Monitoring with Mid-IR Dual-Comb Spectroscopy in a Stopped Flow Application - 440 spectra / second**
F. Eigenmann[1]; R. Horvath[1]; T. Vent-Schmidt[2]; [1] IRsweep, Stäfa/CH; [2] Syngenta, Münchwilen/CH

P 27 **Additively manufactured Flow Cells for Inline Mixing and Reaction Monitoring with Low-Field NMR Spectroscopy**
M. Bornemann-Pfeiffer[1]; S. Kern[2]; N. Jurtz[3]; T. Thiede[1]; M. Kraume[3]; M. Maiwald[1]; [1] Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin/D; [2] S-PACT GmbH, Aachen/D; [3] Technische Universität Berlin, Berlin/D

P 28 **Development and testing of a measuring system for dissolved gases in biogas plants**
R. Retamal Marín[1]; M. Mertig[1]; J. Zosel[1]; [1] Kurt-Schwabe-Institut für Mess- und Sensortechnik Meinsberg e.V., Waldheim/D

P 29 **Optofluidic Force Induction Scheme for the Characterization of Nanoparticle Ensembles**
M. Šimić[1]; G. Prossliner[2]; U. Hohenester[3]; C. Hill[2]; R. Prassl[4]; [1] University of Graz/Brave Analytics GmbH, Graz/A; [2] Medical University of Graz/Brave Analytics GmbH, Graz/A; [3] University of Graz, Graz/A; [4] Medical University of Graz, Graz/A

P 30 **Controlled dilution of micro- and nano-suspension as preparation for single particle measurements**
T. Teumer[1]; T. Hufnagel[1]; F. Wühler[1]; I. Moelyadi[1]; M. Rädle[1]; D. Lerche[2]; [1] Mannheim University of Applied Science, Mannheim/D; [2] LUM GmbH, Berlin/D

P 31 **A multimodal imaging system for three-dimensional analysis**
A. Heintz[1]; F. Wühler[1]; S. Sold[1]; T. Beuermann[1]; M. Rädle[1]; [1] Mannheim University of Applied Science, Mannheim/D

P 32 **A rapid Raman scanning technology for detecting diffusion processes in moving droplets**
J. Deuerling[1]; S. Keck[1]; I. Moelyadi[1]; M. Rädle[1]; J. Repke[2]; [1] Mannheim University of Applied Science, Mannheim/D; [2] Technische Universität Berlin, Berlin/D

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