

ESACT Proceedings

Nigel Jenkins  
Niall Barron  
Paula M. Alves *Editors*

# ESACT

Proceedings of the 21<sup>st</sup> Annual Meeting  
of the European Society  
for Animal Cell Technology (ESACT)  
Dublin, Ireland, June 7-10, 2009



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*Editors*

Prof. Nigel Jenkins  
National Institute of Bioprocessing  
Research & Training  
University College Dublin  
Engineering Building, Belfield  
Dublin  
Ireland  
nigel.jenkins@nibr.ie

Niall Barron  
Dublin City University  
National Institute for Cellular  
Biotechnology  
Dublin  
Ireland  
niall.barron@dcu.ie

Dr. Paula M. Alves  
Instituto de Biologia Experimental  
e Tecnológica (IBET)  
ITQB  
Oeiras  
Portugal  
marques@itqb.unl.pt

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# Introduction

The 21st ESACT conference was held in the beautiful surroundings of the CityWest Hotel resort in Dublin, Ireland. For the first time in ESACT history the number of participants exceeded 900: a sign of the ever increasing importance of this area. The conference commenced on Sunday June 5th with two sets of parallel workshops on the subjects listed below. An additional workshop was held on Monday lunchtime of the conference.

1. Process Analytical Technology (PAT), Quality by Design (QbD) and other recent regulatory developments.
2. Innovative media products for the twenty-first century biopharmaceutical industry.
3. The impact of high titre media feed-streams on monoclonal antibody purification.
4. Advances in genomics and proteomics.
5. Stem Cell Technology: new developments and clinical applications.

The first scientific session on Sunday evening included talks on the on-going efforts to gain better understanding of and ways of improving the cell ‘factories’ that are used to synthesize the ‘magic bullets’ that are modern day recombinant protein therapeutics. Not that long ago, 1 g/L was considered the holy grail in terms of suspension culture of animal cell systems, yet yields of 10 times that level are achievable nowadays. Despite these gains, researchers in the field strive to further improve on these production platforms by shifting the focus from media and hardware optimization to the molecular mechanisms influencing cell behaviour and productivity in the bioreactor. To this end, methods of applying synthetic biology to explore more novel ways of modifying and utilizing nucleic acid sequence in order to influence protein production or function were presented. In addition, greater insights into the exquisite complexity of the control mechanisms within mammalian cells were given in talks focused on temporal expression of mRNA, protein and microRNAs. The consensus view was that it is likely that the next significant gains

in manipulating cell behaviour and phenotypes may come via engineering of entire networks rather than individual genes.

Sessions 2 and 3 focused on the burgeoning field of stem cells and tissue engineering. From its humble beginnings in egg-based vaccine production, Animal Cell Technology (ACT) has now progressed to such a point that the practical considerations of producing large volumes of cGMP cell therapies are now a reality. A diverse and accomplished panel of speakers described their work on all stages of bringing stem cell therapies from discovery through manufacturing to the potentially life-altering or even life-saving applications in the clinic. Large scale production of stem cells brings its own particular sets of challenges including: maintaining the pluri- or multi-potent state, controlled large scale differentiation, and ensuring product quality. Examples were presented of how some of these cell-based interventions are already proving effective in both animal models and some of the first human trials – a wonderful prospect indeed.

On Tuesday June 9th the day started with a session on Animal Cell Bioprocessing. Eli Lilly & Co. described how a new biotherapeutics facility is under construction near Cork, Ireland alongside an existing chemical pharmaceutical plant. Similar developments are occurring at Pfizer near Cork and together biotherapeutics, chemical therapeutics and medical devices account for almost half of Ireland's exports. Other speakers in this session, which was sponsored by Ireland's National Institute for Bioprocessing Research & Training (NIBRT), covered topics such as using disposable bioreactors at the medium to large scale, and scaled down systems for high throughput screens of media components and environmental conditions. The keynote speaker at the end of this session discussed the development of biogeneric drugs (i.e. follow-on biotherapeutics) that are set to increase market share as the older molecules such as erythropoietin (EPO) come off patent.

Tuesday afternoon also saw the first of two poster sessions, the other being on Wednesday morning. Approximately 300 posters were displayed throughout the conference and prizes for best posters were awarded at the Gala Dinner on the evening of Wednesday June 10th. The final session on Tuesday focused on biotherapeutics, i.e. what types of molecule are under development and how can these be modified for greater potency, safety or half-life?

Linking this session with a Wednesday session on recent developments in vaccines and virology was a keynote talk on the immunogenicity of proteins. Vaccines need to be immunogenic to provoke protective humoral and cell-based responses in humans or animals. However, for non-vaccine biotherapeutics the host immune response must be minimized to avoid raising neutralizing antibodies that may compromise the drug's efficacy. Other topics in the vaccine & virology session included improving influenza virus production, and using the heat shock response to improve the efficiency of host cell line virus production.

This volume contains much of the excellent data presented and discussed at the 21st ESACT meeting.

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# Contributors

**Myriam Adam** Laboratory of Cellular Biotechnology, School of Life Sciences, École Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Spiros N. Agathos** Unit of Bioengineering, Institut des Sciences de la Vie, Université Catholique de Louvain, 1348 Louvain-la-Neuve, Belgium; Genie Biologique, Institut Des Sciences De La Vie, Université Catholique de Louvain, B-1348 Louvain-La-Neuve, Belgium

**D. Aguiar** Research and Development Direction, Center of Molecular Immunology, Havana, 11600, Cuba

**M.A. Aguiar** Laboratory of Industrial Biotechnology, IPT, S. Paulo, SP, Brazil

**Naima Alaoui** ATMI LifeSciences/Artelis, Brussels, Belgium

**Paula M. Alves** Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa (UNL), 2780-157 Oeiras, Portugal; Animal Cell Technology Unit, Instituto de Biologia Experimental e Tecnológica (IBET), 2780-157 Oeiras, Portugal, marques@itqb.unl.pt

**Eva-Maria Amann** Central Institute of Blood Transfusion and Immunology, University Hospital, Innsbruck, Austria

**A.I. Amaral** Instituto de Biologia Experimental e Tecnológica (IBET), 2780-901 Oeiras, Portugal; Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa, 2781-901 Oeiras, Portugal

**Raquel Ambrósio** Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa (UNL), Oeiras, Portugal; Animal Cell Technology Unit, Instituto de Biologia Experimental e Tecnológica (IBET), Oeiras, Portugal

**Amy Antosh** Sheffield Life Sciences, Center for Cell Culture Technology, Ithaca, NY 14850, USA

**Giannini Apati** Recombinant Protein Expression Group, Helmholtz Centre for Infection Research, Braunschweig, Germany; Universidade da Região de Joinville, Joinville, Brazil

**E.F.P. Augusto** Laboratory of Industrial Biotechnology, IPT, S. Paulo, SP, Brazil

**James F. Babcock** Sheffield Life Sciences, Center for Cell Culture Technology, Ithaca, NY 14850, USA, james.babcock@kerry.com

**Virginie Bachmann** Laboratory of Cellular Biotechnology, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Gaurav Backliwal** Laboratory of Cellular Biotechnology, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland; Excellgene S.A., Monthey, Switzerland

**Wilfried A.M. Bakker** National Institute for Public Health and the Environment (RIVM), P.O. Box 1, 3720 BA, Bilthoven, The Netherlands, wilfried.bakker@rivm.nl

**Lucia Baldi** Laboratory of Cellular Biotechnology, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Sara Bantner** Department of Gene Regulation and Differentiation, HZI – Helmholtz Centre for Infection Research, Braunschweig, Germany

**R.P. Baptista** Institute for Biotechnology and Bioengineering, Centre for Biological and Chemical Engineering, Instituto Superior Técnico, Av Rovisco Pais, Torre Sul-piso8, 1049-001 Lisbon, Portugal, ricardopb@ist.utl.pt

**D.M. Barata** Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Lisbon, Portugal

**Jérémie Barbau** Biochimie Cellulaire, Nutritionnelle & Toxicologique, Institut Des Sciences De La Vie, Université Catholique de Louvain, B-1348 Louvain-la-Neuve, Belgium

**N. Barbouche** LRGP, CNRS UPR 3349 Nancy-Université, INPL, F-54505 Vandœuvre-lès-Nancy, France

**M.F. Barral** Santo André Foudation, S. André, SP, Brazil

**Eliezer Barreiro** LASSBio, Universidad Federal de Rio de Janeiro, Rio de Janeiro, Brazil

**Bonnie L. Barrilleaux** Department of Chemical and Biomolecular Engineering and Tulane Center for Gene Therapy, Tulane University, New Orleans, LA 70118, USA

**Niall Barron** National Institute for Cellular Biotechnology, Dublin City University, Dublin, Ireland, niall.barron@dcu.ie

**F.R.X. Batista** School of Chemical Engineering, State University of Campinas, Campinas, SP, Brazil

**Larissa Behr** Institute for Technical Chemistry, Leibniz University Hanover, 30167 Hanover, Germany

**Brian Benoit** Seahorse Bioscience, North Billerica, MA, USA; BioProcessors Corp., Woburn, MA, USA

**Vicente Bernal** Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa (UNL), Oeiras, Portugal; Animal Cell Technology Unit, Instituto de Biologia Experimental e Tecnológica (IBET), Oeiras, Portugal; Facultad de Química, Departamento de Bioquímica y Biología Molecular B e Inmunología, Universidad de Murcia, E-30100 Murcia, Spain

**Patrick Bernard-Moulin** Thermo Fisher Scientific, F-91963 Courtaboeuf Cedex, France

**Olivier Berteau** Fogale nanotech, Nîmes, France

**Kenneth C. Bertram** Novozymes Biopharma AU Ltd, Thebarton, SA 5031, Australia

**Ankur Bhatnagar** Biocon Limited, Bangalore, India, ankur.bhatnagar@biocon.com

**Corinna Bialek** CEVEC Pharmaceuticals GmbH, 51105 Cologne, Germany

**B.E. Bihain** Genclis SAS, 54500 Vandoeuvre-lès-Nancy, France

**Fabrice Blanchard** LRGP, CNRS UPR 3349 Nancy-Université, INPL, F-54505 Vandoeuvre-lès-Nancy, France; Laboratoire des Sciences du Génie Chimique, UPR CNRS 6811, Nancy-Université, F-54505 Vandoeuvre-lès-Nancy Cedex, France

**Marjanca Blas** Biopharmaceuticals-Cell and Molecular Biology, Lek Pharmaceuticals d.d., Menges Site, SI-1234 Menges, Slovenia

**Andra Bobart** Royal Victoria Eye & Ear Hospital, Dublin-2, Ireland

**Andreas Bock** Bioprocess Engineering Group, Max Planck Institute for Dynamics of Complex Technical Systems, 39106 Magdeburg, Germany

**Stefanie Böhm** Institute of Technical Chemistry, Leibniz University Hanover, 30167 Hanover, Germany

**Mariela Bollati-Fogolín** Cell Biology Unit, Institut Pasteur de Montevideo, Montevideo, Uruguay, mbollati@pasteur.edu.uy

**Björn Breth** Greiner Bio-One GmbH, 72636 Frickenhausen, Germany, info@de.gbo.com

**Lara Breth** Greiner Bio-One GmbH, Maybachstr. 2, 72636 Frickenhausen, Germany, lara.breth@gbo.com

**H. Brod** Bayer Technology Services, 51368 Leverkusen, Germany

**Dacia R. Brooks** Late Stage Cell Culture, Pharma Technical Development, Genentech, A Member of the Roche Group, South San Francisco, CA 94080, USA

**C. Bürki** ExcellGene SA, CH-1870 Monthey, Switzerland

**Konrad Büsow** Recombinant Protein Expression (RPEX), Department of Structural Biology, Helmholtz Centre for Infection Research, Braunschweig, Germany

**Milada Butueva** Department of Gene Regulation and Differentiation, HZI – Helmholtz Centre for Infection Research, Braunschweig, Germany

**Lovisa Bylund** RecipharmCobra Biologics, 152 57 Södertälje, Sweden

**J.M.S. Cabral** Institute for Biotechnology and Bioengineering, Centre for Biological and Chemical Engineering, Instituto Superior Técnico, Lisbon, Portugal

**Jordi J. Cairó** Department d'Enginyeria Química (ETSE), Universitat Autònoma de Barcelona, Edifici Q, 08193 Bellaterra, Barcelona, Spain

**Tobias Cantz** Stem Cell Biology, Cluster-of-Excellence “REBIRTH”, Hannover Medical School, Hanover, Germany, Cantz.tobias@mh-hannover.de

**Nuno Carinhas** Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa (UNL), Oeiras, Portugal; Animal Cell Technology Unit, Instituto de Biologia Experimental e Tecnológica (IBET), Oeiras, Portugal

**M. Carmo** Instituto de Biologia Experimental e Tecnológica (IBET), 2780-901 Oeiras, Portugal; Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa, 2781-901 Oeiras, Portugal

**Manuel J.T. Carrondo** Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa (UNL), Oeiras, Portugal; Animal Cell Technology Unit, Instituto de Biologia Experimental e Tecnológica (IBET), Oeiras, Portugal; Laboratório de Engenharia Bioquímica, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Lisbon, Portugal

**J.P. Carvell** Aber Instruments Ltd., 5 Science Park, Aberystwyth, Ceredigion, SY23 3AH, UK, johnc@aberinstruments.com

**L. Castellanos-Serra** Center for Genetic Engineering and Biotechnology, Havana, Cuba

**A.J. Castillo** Research and Development Direction, Center of Molecular Immunology, Havana, 11600, Cuba

**A. Castillo-Vitlloch** Research and Development Direction, Center of Molecular Immunology, Havana, Cuba

**Leda R. Castilho** Cell Culture Engineering Laboratory (LECC), Federal University of Rio de Janeiro (UFRJ), COPPE, Rio de Janeiro/RJ, 21941-972, Brazil

**José Castillo** ATMI LifeSciences/Artelis, Brussels, Belgium

**Luigi Cavenaghi** Areta International, 21040 Gerenzano (VA), Italy

**Natalia Ceaglio** Laboratorio de Cultivos Celulares, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral, Santa Fe, Argentina, nceaglio@fcb.unl.edu.ar

**Hugo Cerecetto** Laboratorio de Química, Orgánica Facultad de Ciencias-Facultad de Química, Montevideo, Uruguay

**Salim Charaniya** Genentech, Inc., Oceanside, CA 92056, USA

**Tim Charlebois** Wyeth, New York, NY, USA, TCharlebois@pfizer.com

**Srikanth Chary** Late Stage Cell Culture, Pharma Technical Development, Genentech, Inc., South San Francisco, CA, USA

**Sebastien Chenuet** Laboratory of Cellular Biotechnology, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Yuen-Ting Chim** Mammalian Process Research, GlaxoSmithKline, Stevenage, UK; BioPharm Process Research, GlaxoSmithKline Medicines Research Centre, SG1 2NY Stevenage, Herts, UK

**Larissa Chirkova** Novozymes Biopharma Au Ltd, Thebarton, SA, Australia

**Véronique Chotteau** Biovitrum, presently at Animal Cell Technology Group, School of Biotechnology, Royal Institute of Technology (KTH), Stockholm, Sweden, veronique.chotteau@biotech.kth.se

**Panagiotis Chrysanthopoulos** Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbane, QLD 4072, Australia

**M.-F. Clincke** Laboratoire Réactions et Génie des Procédés, UPR-CNRS 3349, Vandoeuvre-lès-Nancy, France; Lipidomix (EA4422), ENSAIA-INPL, Nancy Université, 54500 Vandoeuvre-lès-Nancy, France; Genclis SAS, 54500 Vandoeuvre-lès-Nancy, France

**Martin Clynes** National Institute for Cellular Biotechnology, Dublin City University, Dublin, Ireland

**Joe Codamo** Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbane, QLD 4072, Australia; Acyte Biotech Pty Ltd, Brisbane, QLD 4072, Australia

**Tobias Cohen** EpiVax and Institute for Immunology and Informatics (I-cubed), University of Rhode Island, Kingston, RI, USA

**Florence Collignon** ATMI LifeSciences/Artelis, Brussels, Belgium

**Harald S. Conradt** GlycoThera GmbH, Hanover, Germany

**Ana S. Coroadinha** Instituto de Biologia Experimental e Tecnológica (IBET), 2780-157 Oeiras, Portugal; Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa (UNL), Av. da República, Estação Agronómica Nacional, 2780-157 Oeiras, Portugal, [avalete@itqb.unl.pt](mailto:avalete@itqb.unl.pt)

**Abner Correia** New England Controls, Inc., Foxborough, MA, USA

**Caitriona Crawford** Pfizer, Grange Castle Business Park, Clondalkin, Dublin 22, Ireland

**Chiara Crosta** Areta International, 21040 Gerenzano VA, Italy

**Kerstin Crowe** Bioprocessing R&D, Pfizer, Inc., Andover, MA 01810, USA

**C. Lobato da Silva** Institute for Biotechnology and Bioengineering, Centre for Biological and Chemical Engineering, Instituto Superior Técnico, Lisbon, Portugal

**Anna Daniel-Wojcik** Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), D-06466 Gatersleben, Germany

**Anne S. De Groot** EpiVax, Providence, RI, USA; Institute for Immunology and Informatics (I-cubed), University of Rhode Island, Kingston, RI, USA, [AnnieD@epivax.com](mailto:AnnieD@epivax.com)

**M. De Jesus** ExcellGene SA, CH-1870 Monthey, Switzerland

**K.R. de la Luz-Hernández** Research and Development Direction, Center of Molecular Immunology, Havana, Cuba; Michael Barber Center for Mass Spectrometry, School of Chemistry and Manchester Interdisciplinary Biocenter, University of Manchester, Manchester, UK, [katiar@cim.sld.cu](mailto:katiar@cim.sld.cu)

**D. De Sanctis** Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Fabien Debras** Artelis, Brussels, Belgium

**Frank Deer** Ipsen Biomeasure, Milford, MA, USA, [frank.deer@ipson.com](mailto:frank.deer@ipson.com)

**Maria de Jesus** Excellgene S.A, Monthey, Switzerland

**Fanny Delegrange** Laboratory of Cellular Biotechnology, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Cynthia Deppeler** Pfizer, Inc., St. Louis, MO, USA

**Saravanan Desan** Biocon Limited, Bangalore, India, [Saravanan.Desan@biocon.com](mailto:Saravanan.Desan@biocon.com)

**J. Díaz-Brito** Faculty of Biology, University of Havana, Havana, Cuba

**Caroline Didier** Laboratorio de Cultivos Celulares, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral, Santa Fe, Argentina



**K. Didzus** Pharma Biotech Production and Development, Roche Diagnostics GmbH, Penzberg, Germany

**Solvig Diederichs** Institute of Technical Chemistry, Leibniz University Hanover, 30167 Hanover, Germany; Ludwig Boltzmann Institute for Experimental and Clinical Traumatology, 1200 Vienna, Austria

**Stefanie Dietmair** Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbane, QLD 4072, Australia, s.dietmair@uq.edu.au

**M.M. Diogo** Institute for Biotechnology and Bioengineering, Centre for Biological and Chemical Engineering, Instituto Superior Técnico, Lisbon, Portugal

**M. Discacciati** Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Quang Doan** Novozymes Biopharma Au Ltd, Thebarton, SA, Australia

**Davide Donati** Istituto Ortopedico Rizzoli, 40136, Bologna (BO), Italy

**Patrick Dowling** Pfizer, Grange Castle Business Park, Clondalkin, Dublin 22, Ireland

**Jean-Christophe Drugmand** ATMI LifeSciences/Artelis, Brussels, Belgium, jcdrugmand@atmi.com

**Stéphanie Dubois** Artelis, Brussels, Belgium

**Ralph Duhr** Laboratory of Cellular Biotechnology, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**M. Edler** Institute of Chemistry, University of Loeben, Loeben, Austria

**Reto Eggenschwiler** Stem Cell Biology, Cluster-of-Excellence “REBIRTH”, Hannover Medical School, Hanover, Germany

**F. Egner** InVivo BioTech Services, D-16761 Hennigsdorf, Germany, f.egner@invivo.de

**Regine Eibl** Zurich University of Applied Sciences, School of Life Sciences and Facility Management, Institute of Biotechnology, Grüental, 8820 Wädenswil, Switzerland

**Elsayed A. Elsayed** Faculty of Science, Advanced Chair for Proteomics & Cytomics Research, King Saud University, Riyadh 1145, Kingdom of Saudi Arabia, eaelsayed@ksu.edu.sa

**Eva-Maria Engelhardt** Laboratory of Cellular Biotechnology, School of Life Sciences, École Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Pablo Espósito** Cell Biology Unit, Institut Pasteur de Montevideo, Montevideo, Uruguay

**Ruth Essers** CEVEC Pharmaceuticals GmbH, 51105 Köln, Germany, essers@cevec.com

**Geoffrey Esteban** Fogale nanotech, Nîmes, France

**Marina Etcheverrigaray** Laboratorio de Cultivos Celulares, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral, Santa Fe, Argentina

**E. Faife** Research and Development Direction, Center of Molecular Immunology, Havana 11600, Cuba

**M. Farhat** Laboratory for Hydraulic Machines, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**Ronald Fedechko** Pfizer, Inc., St. Louis, MO, USA

**Elisabeth Feifel** Division of Physiology, Innsbruck Medical University, Innsbruck, Austria

**Christel Fenge** RecipharmCobra Biologics, 152 57 Södertälje, Sweden

**Paulo Fernandes** Instituto de Biologia Experimental e Tecnológica (IBET), 2780-157 Oeiras, Portugal; Instituto de Tecnologia Química e Biológica (ITQB), Universidade Nova de Lisboa, 2780-157 Oeiras, Portugal

**Guilherme N.M. Ferreira** IBB – Institute for Biotechnology and Bioengineering, Centre for Molecular and Structural Biomedicine, University of Algarve, Faro, Portugal

**David Ferrick** Seahorse Bioscience, North Billerica, MA, USA

**Benjamin W. Fischer-Valuck** Department of Chemical and Biomolecular Engineering and Tulane Center for Gene Therapy, Tulane University, New Orleans, LA 70118, USA

**L.P. Fonseca** Institute for Biotechnology and Bioengineering, Centre for Biological and Chemical Engineering, Instituto Superior Técnico, Lisbon, Portugal

**Guillermina Forno** Laboratorio de Cultivos Celulares, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral, Santa Fe, Argentina; Zelltek S.A, Santa Fe, Argentina, gforno@fcb.unl.edu.ar

**F. Fournier** LRGP, CNRS UPR 3349 Nancy-Université, INPL, F-54505 Vandœuvre-lès-Nancy, France

**B. Frahm** Bayer Technology Services, 51368 Leverkusen, Germany, bjoern.frahm@bayertechology.com

**Geoffrey L. Francis** Novozymes Biopharma AU Ltd, Thebarton, SA 5031, Australia

**Andrej Francky** Biopharmaceuticals-Cell and Molecular Biology, Lek Pharmaceuticals d.d., Menges Site, SI-1234 Menges, Slovenia

**Linda Francullo** Bioprocessing R&D, Pfizer, Inc., Andover, MA 01810, USA

**Sadaharu Fukui** Department of Chemistry and Biochemistry, Suzuka National College of Technology, Shiroko-cho, Suzuka, Mie, 510-0294, Japan

**Ken Fukumoto** Department of Applied Chemistry and Biotechnology, Graduate School of Engineering, University of Fukui, Fukui 910-8507, Japan

**J. Gabelsberger** Pharma Biotech Production and Development, Roche Diagnostics GmbH, Penzberg, Germany

**Marta Galgano** Areta International, 21040 Gerezano VA, Italy

**Patrick Gammell** National Institute for Cellular Biotechnology, Dublin City University, Dublin, Ireland; Bio-Manufacturing Sciences Group, Pfizer, Inc., Grange Castle International Business Park, Clondalkin, Dublin, Ireland

**Dominik Gaser** Biopharmaceuticals-Cell and Molecular Biology, Lek Pharmaceuticals d.d., Menges Site, SI-1234 Menges, Slovenia

**S. Gaskell** Michael Barber Center for Mass Spectrometry, School of Chemistry and Manchester Interdisciplinary Biocenter, University of Manchester, Manchester, UK

**Martin Gawlitzek** Late Stage Cell Culture, Pharma Technical Development, Genentech, A Member of the Roche Group, South San Francisco, CA 94080, USA

**Valérie Gelbgras** Transfers, Interfaces and Processes, Université Libre de Bruxelles, Brussels, Belgium, Valerie.Gelbgras@ulb.ac.be

**Gittan Gelius** RecipharmCobra Biologics, 152 57 Södertälje, Sweden

**Cécile Gény** Sanofi Pasteur, F-69280 Marcy L'Etoile, France

**Yvonne Genzel** Bioprocess Engineering Group, Max Planck Institute for Dynamics of Complex Technical Systems, 39106 Magdeburg, Germany, genzel@mpi-magdeburg.mpg.de

**Ermanno Gherardi** Laboratory of Molecular Biology, MRC Centre, CB2 2QH Cambridge, UK

**P.-A. Girod** Selexis, Geneva, Switzerland

**Ilaria Giuntini** Areta International, 21040 Gerezano VA, Italy

**Francesc Gòdia** Department d'Enginyeria Química (ETSE), Universitat Autònoma de Barcelona, Edifici Q, 08193 Bellaterra, Barcelona, Spain

**Anuj Goel** Biocon Limited, Bangalore, India, anuj.goel@biocon.com

**Ekta Goel** Life Technologies, Grand Island, NY 14072, USA

**Christiane Goepfert** Hamburg University of Technology, Hamburg, Germany

**J.-L. Goergen** Laboratoire Réactions et Génie des Procédés, UPR-CNRS 3349, Vandoeuvre-lès-Nancy, France, jean-louis.goergen@ensaia.inpl-nancy.fr

**Héctor Goicoechea** Laboratorio de Desarrollo Analítico y Quimiometría (LADAQ), Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral, Santa Fe, Argentina

**Mercedes González** Laboratorio de Química, Orgánica Facultad de Ciencias-Facultad de Química, Montevideo, Uruguay

**Steve Gorfien** Life Technologies, Grand Island, NY 14072, USA

**Manfred Gossen** Max-Delbrück-Center for Molecular Medicine, 13125 Berlin, Germany

**Peter P. Gray** NCRIS Biologics Facility, Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbane, QLD 4072, Australia; Acyte Biotech Pty Ltd, Brisbane, QLD 4072, Australia

**Gerhard Greller** Sartorius Stedim Biotech GmbH, Göttingen, Deutschland, Germany, Gerhard.Greller@Sartorius-Stedim.com

**Benedikt Greulich** Celonic AG, Basel, Switzerland, Benedikt.Greulich@celonic.ch

**Sally Grosvenor** Novozymes Biopharma AU Ltd., Thebarton, SA 5031, Australia, slyg@novozymes.com

**Gerhard Gstraunthaler** Division of Physiology, Innsbruck Medical University, A-6020 Innsbruck, Austria, gerhard.gstraunthaler@i-med.ac.at

**E. Guedon** Laboratoire Réactions et Génie des Procédés, UPR-CNRS 3349, Nancy-Université, INPL, F-54505 Vandoeuvre-lès-Nancy, France

**J.S. Guez** Laboratoire ProBioGEM, UPRES-EA 1024, Polytech-Lille/IUT A, Université des Sciences et Technologies de Lille, Avenue Paul Langevin, F-59655 Villeneuve d'Ascq, France, jean-sebastien.guez@polytech-lille.fr

**Claas Haake** Institute for Technical Chemistry, Leibniz University Hanover, D-30167 Hanover, Germany

**David L. Hacker** Laboratory of Cellular Biotechnology, School of Life Sciences, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

**R. Hass** Laboratory of Biochemistry and Tumor Biology, Department of Obstetrics and Gynecology, Medical University, Hannover, 30625 Hannover, Germany

**T. Hatlapatka** Institute of Technical Chemistry, Leibniz University Hanover, 30167 Hanover, Germany

**Hansjörg Hauser** Department of Gene Regulation and Differentiation,  
HZI – Helmholtz Centre for Infection Research, Braunschweig, Germany

**Benoît Haut** Transfers, Interfaces and Processes, Université Libre de Bruxelles,  
Brussels, Belgium

**Nicolas Havelange** ATMI LifeSciences/Artelis, Brussels, Belgium,  
nha@atmi.com

**Mary Heenan** Pfizer, Grange Castle Business Park, Clondalkin, Dublin 22,  
Ireland

**Robin Heller-Harrison** Bioprocessing R&D, Pfizer, Inc., Andover, MA 01810,  
USA

**Jan Hendriks** National Institute for Public Health and the Environment (RIVM),  
P.O. Box 1, 3720 BA, Bilthoven, The Netherlands

**René Hennig** Max-Planck-Institute Magdeburg, Magdeburg, Germany

**M. Henry** National Institute for Cellular Biotechnology, Dublin City University,  
Dublin 9, Ireland

**Paola Hernández** Laboratorio de Química, Orgánica Facultad de  
Ciencias-Facultad de Química, Montevideo, Uruguay

**Andreas Herrmann** Celonic AG, Basel, Switzerland

**Sabrina Herrmann** Department of Gene Regulation and Differentiation,  
Helmholtz Centre for Infection Research, Braunschweig, Germany

**Sabine Hertel** CEVEC Pharmaceuticals GmbH, 51105 Cologne, Germany

**Rudy Hertroys** Netherlands Vaccine Institute, 3720 AL, Bilthoven,  
The Netherlands

**Markus Hildinger** Excellgene S.A., Monthey, Switzerland

**Gregory Hiller** Bioprocessing R&D, Pfizer, Inc., Andover, MA 01810, USA

**L. Hinojosa** Research and Development Direction, Center of Molecular  
Immunology, Havana, 11600, Cuba

**Håkan Hjalmarsson** School of Electrical Engineering, Automatic Control, Royal  
Institute of Technology (KTH), Stockholm, Sweden, hakan.hjalmarsson@ee.kth.se

**Hans Hoffmeister** Zellwerk GmbH, 16727 Oberkraemer, Germany

**Raimund Hoffrogge** Institute for Cell Culture Technology, University of  
Bielefeld, Bielefeld, Germany

**Shinji Hosoi** Bio Process Research and Development Laboratories, Kyowa Hakko  
Kirin Co., LTD, Takasaki-shi, Gunma 370-0013, Japan

**Jeff Jia Cheng Hou** Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbane, QLD 4072, Australia, j.hou1@uq.edu.au

**Kristin Höwing** ProBioGen AG, Berlin, Germany

**Wei-Shou Hu** Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN 55455, USA, acre@cems.umn.edu

**Benjamin S. Hughes** Australian Institute for Bioengineering and Nanotechnology, The University of Queensland, Brisbane, QLD 4072, Australia

**Neysi Ibarra** Pfizer, Grange Castle Business Park, Dublin 22, Ireland

**Britta Isken** Bioprocess Engineering Group, Max Planck Institute for Dynamics of Complex Technical Systems, 39106 Magdeburg, Germany, isken@mpi-magdeburg.mpg.de

**Nadia Jafâr** ATMI LifeSciences/Artelis, Brussels, Belgium

**Volker Jäger** Recombinant Protein Expression Group, Helmholtz Centre for Infection Research, Braunschweig, Germany, Volker.Jaeger@helmholtz-hzi.de

**Kirin M. Jamison** Late Stage Cell Culture, Pharma Technical Development, Genentech, A Member of the Roche Group, South San Francisco, CA 94080, USA, kirin@gene.com

**Uros Jamnikar** Biopharmaceuticals-Cell and Molecular Biology, Lek Pharmaceuticals d.d., Menges Site, Kolodvorska 27, SI-1234 Menges, Slovenia, uros.jamnikar@sandoz.com

**David Jan** Centocor, Malvern, PA, USA

**Jean-François Michiels** Biochimie Cellulaire, Nutritionnelle & Toxicologique, Institut Des Sciences De La Vie, Université Catholique de Louvain, B-1348 Louvain-la-Neuve, Belgium

**Nigel Jenkins** Upstream Bioprocessing Group, National Institute for Bioprocessing Research and Training (NIBRT), NICB Building, DCU, Dublin, Ireland

**Corinne John** Redbiotec AG, Wagistrasse 23, 8952 Schlieren, Switzerland

**Kevin Johnson** Genentech, Inc., Vacaville, CA 95688, USA

**Ingo Jordan** ProBioGen AG, Berlin, Germany, ingo.jordan@probiogen.de

**Sandra Juanola** Department d'Enginyeria Química (ETSE), Universitat Autònoma de Barcelona, Edifici Q, 08193 Bellaterra, Barcelona, Spain

**Zuzana Kadlecova** Laboratory of Polymers, École Polytechnique Fédérale de Lausanne, Institute of Materials, Lausanne, Switzerland

**Héla Kallel** Viral Vaccines R&D Unit, Institut Pasteur de Tunis, 1002 Tunis, Tunisia, hela.kallel@pasteur.rns.tn

**Dorothea Karrer** Redbiotec AG, Wagistrasse 23, 8952 Schlieren, Switzerland