Plamen Atanassov (Univ. of New Mexico) plamen@unm.edu

Research interests:
• fuel cell electrocatalysts
• battery materials
• materials scale-up & manufacturability
• fuel cells durability
• biological fuel cells
• electrochemical & biosensors

Techniques:
• Voltammetry, RDE/RRDE & EIS
• MEA & Short Stack Testing
• In situ FTIR, TGA-MS, BET-PSD
• HR-SEM/EDS, HR-TEM/EELS, XPS

Would like to know more about (regarding AEMs):
• membranes & ionomers
• MEA fabrication
• fuel cell designs

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Pt-metal free fuel cell technology: just because we can!
Utilization of complex fuels and bio(derived) fuels: only if!
Bernd Bauer  (FuMA-Tech GmbH)  bb@fumatech.de

Research interests:
• desalination and disinfection of water using electro-membrane processes
• electrolysis (chlorine, HCl, hydrogen, etc.)
• electro-membrane applications in chemistry
• batteries and fuel cells

Techniques:
• polymer functionalization
• membrane formation (casting)
• electrochemical characterisation
• impedance spectroscopy
• application studies

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
• electrodialysis and bipolar membrane technology (incl. acid dialysis)
• alkaline electrolysis of water and alkaline fuel cells
• multi-chamber membrane electrolysis

Would like to know more about (regarding AEMs):
• improved conductivity
• improved chemical stability
• low cost materials
Dan Brett (University College London) d.brett@ucl.ac.uk

Research interests:
• Fuel cells
• Electrochemical power systems
• Electrochemical engineering

Techniques:
• Electrochemical techniques
• Electrochemical impedance spectroscopy
• Novel diagnostics for fuel cells

Would like to know more about (regarding AEMs):
• Availability
• Degradation
• Water management

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Fuel cells – lowers cost of catalyst
Richard Burkitt (Newcastle University) richard.burkitt@ncl.ac.uk

Research interests:
• Bio-electrocatalysis
• Electrochemical remediation of pollutants with Bio-electrochemical systems

Techniques:
• Impedance Spectroscopy
• RRDE thin film techniques on electrocatalysis and electron/ion propagation in catalyst layers
• Microbial Fuel Cell reactors in biotic media

Would like to know more about (regarding AEMs):
• Anion binding to common anion exchange sites and this effect on transference no.
• Radiation grafting.

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Alkaline Ethanol/Methanol Fuel Cells. Liquid feedstock, feed does not need to be as pure as H₂/O₂ Fuel Cells.
Research interests:
• Polymer synthesis
• Polymer bioconjugation
• Nanotechnology
• Synthesis Biology

Techniques:
• NMR
• GPC
• Synthesis

Would like to know more about (regarding AEMs):
• Bioapplications
• Bioinspired systems

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?
Charge separation and transport is essential in biological systems (source for application and inspiration)
Research interests:
• Alkaline Membrane Fuel Cells
• AEMs
• Electrocatalysts for AMFCs
• AMFC stacks
• AMFC-based systems

Techniques:
• Electrochemical, chemical, and polymer characterization and test techniques for research, development, and testing of anion conducting membranes / ionomers and AMFCs.
• Electrochemical, mechanical, and thermal characterization and test techniques for research, development, and testing of AMFCs, AMFC-based stacks and AMFC-based systems.

Would like to know more about (regarding AEMs):
• Functional groups stability in real FC conditions
• High temperature (stable) anion conducting ionomers
• Real CO₂-tolerant AEM and anion conducting ionomers
Corinna Harms (NEXT ENERGY) corinna.harms@next-energy.de

Research interests:
• Alkaline membranes for fuel cell application
• Fuel cell stack characterisation
• µ-CHP application

Techniques:
• electrochemical: EIS, CV, LSV, polarisation curves
• thermal: DSC, TGA/GC-MS, DMA
• µ-CT, ICP-MS

Would like to know more about (regarding AEMs):
• membrane stability
• new concepts for anion conducting groups

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Polarisation curves
Research interests:
• Polymer Electrolyte Membranes
• Electrode and MEA development
• Photo-Electrochemical Water Splitting
• Thermochemical Conversion of Hydrocarbons

Techniques:
• Electrochemistry
• Spectroscopy - NMR/FTIR
• Synchrotron techniques - SAXS/EXAFS

Would like to know more about (regarding AEMs):
• Commercialization Activities
• Market Development

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Fuel Cells/Electrolyzers – Still the promise of non-noble metal versatile catalysis
Electrochemical Ion pumps – Niche applications for early adoption
Research interests:
• Rapid AEM synthesis
• Water-polymer interactions
• AEM stability
• Hydration in ion-containing membranes

Techniques:
• Polymer synthesis
• Spectroscopy
• Morphology

Would like to know more about (regarding AEMs):
• How cation size influences hydration and conductivity.
• What will be 10x more stable than BTMA?

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?
Vanadium redox flow batteries – good initial AEM performance and large market.
Water treatment membranes with or without electrochemistry – large market.
Tobias Hoefner (Juelich-Research-Center) t.hoefner@fz-juelich.de

Research interests:
• Water Electrolysis
• Membrane-Evaluation
• Catalyst-Evaluation

Techniques:
• Cyclic Voltammetry with Rotating-Disk-Electrode
• Electrochemical Impedance Spectroscopy

Would like to know more about (regarding AEMs):
• AEM-Degradation
• MEA-/CCM-Design

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
AEM-Water-Electrolysis -

Because it is the topic of my PhD-thesis
Research interests:
• Polymer Science
• Electrochemistry
• Fuel Cells
• Polymer Electronics

Techniques:
• Polymer Synthesis
• Polymer Characterization
• Electroanalytical Methods

Would like to know more about (regarding AEMs):
• Applications,
• Integration,
• State-of-the-art membranes

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?
FCs: (potential for non-precious metal catalysts)
VRBs: (reduced vanadium ion crossover)
Water electrolysis: (Non-precious metal catalysts, no caustic liquids.)
Research interests:
• Microbial Fuel Cells
• Membrane Stability

Techniques:
• Bacterial Analysis
• Titrations, Conductivity, Gravimetric Analysis
• Raman and IR Spectroscopy

Lucy Howes (University of Surrey) l.howes@surrey.ac.uk

Would like to know more about (regarding AEMs):
• Oxygen Permeability

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?
Microbial fuel cells, because tests have shown improved performance and stability of the cells using AEMs
Research interests:
• AAEM Fuel Cells
• Alkaline Catalysis
• MEA Optimization

Techniques:
• Catalyst Synthesis
• Rotating Disk Electrochemistry
• Fuel Cell Testing
• MEA Fabrication

Rhodri Jervis (UCL) rhodri.jervis.10@ucl.ac.uk

Would like to know more about (regarding AEMs):
• Sources of New AEMs
• Ionomer Solutions as binders in inks
• Progress in the last 3 years

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Fuel cells, as a route to cost reduction of the catalyst layer
Research interests:
• Ion-exchange polymers  
• Cation-exchange membranes  
• Anion-exchange membranes

Techniques:
• Low-T fuel cells  
• Intermediate-T fuel cells  
• Direct methanol fuel cells  
• PEM electrolysis

Jochen Kerres (University of Stuttgart)  
jochen.kerres@icvt.uni-stuttgart.de

Would like to know more about (regarding AEMs):
• Alternative cations  
• Latest advances in non-Pt catalysts for AEM

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Hydrogen fuel cells (cheaper catalysts)  
Electrodialysis (required)
Research interests:
• Beyond RDE for catalyst characterisation
• Effects of contaminants and remediation
• Novel diagnostics for fuel cells and RFBs

Techniques:
• Ultra-low loading electrodes
• In situ corrosion measurements
• All standard electrochemical methods

Anthony Kucernak (Imperial College) anthony@imperial.ac.uk

Would like to know more about (regarding AEMs):
• Stable head groups
• Production of ionomers

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Redox flow batteries as power densities and temperatures are not as extreme as for fuel cells
Research interests:
• Redox Flow Batteries (RFBs)
• Membranes – cation and anion
• Vanadium Electrochemistry

Techniques:
• Spectroscopic Characterisation (Raman, ATR-IR and UV-vis)
• Vanadium Cation Permeability
• Ionic Conductivity (Protons)
• Stability (highly oxidising environments)

Would like to know more about (regarding AEMs):
• Stable Amine groups
• Degradation pathways

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Possibly RFBs (reducing vanadium cation crossover) if more stable head groups are found
Neil McKeown (Cardiff University) mckeownnb@cardiff.ac.uk

Research interests:
• The synthesis of polymers for membrane applications.

Techniques:
• Polymer synthesis and characterisation

Would like to know more about (regarding AEMs):
• Anything and everything
• Collaborations

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
…I lack the background to have formed an opinion!
Research interests:

• AEM stability
• Head group model compounds

Techniques:

• Chloride titrations
• Graft AEM amination
• Model compound synthesis

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?

Currently: mild conditions, or as a replaceable component.
Research interests:
• Synthesis of oxygenates in room temperature carbonate fuel cells
• Alternative electrocatalysts supports (i.e. ceramics, functionalized carbon)
• High energy density electrodes for Li-ion batteries and supercapacitors

Techniques:
• Synthesis of high surface area materials
• Voltammetry, Electrochemical Impedance, CPR, chrono-methods
• XPS, XRD, RAMAN, FT-IR, TEM, SEM, TGA, MS, TPD

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Energy Conversion – Alkaline environment can yield low cost catalysts and AEMs are CO₂ “tolerant”

Would like to know more about (regarding AEMs):
• Effect of the N charge center on carbonate/bicarbonate equilibrium
• Stable, castable anionomers
Kitty Nijmeijer (University of Twente) d.c.nijmeijer@utwente.nl

Research interests:
• Membrane science and technology
• Polymer membranes
• Application areas: Energy and water
• Electromembrane processes, gas and vapor separation, water treatment (UF/NF/RO)

Techniques:
• Membrane characterization
• Membranes for
• Salinity Gradient Energy
• Molecular membrane design

Would like to know more about (regarding AEMs):
• Chemistry of AEMs
• Structure-properties relations

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
No preference
Bryan Pivovar (National Renewable Energy Lab) bryan.pivovar@nrel.gov

Research interests:
• Cation stability under basic conditions
• Novel AEM synthesis (PF AEMs)
• MEA fabrication and performance

Techniques:
• EGA (Evolved Gas Analysis)
• NMR
• DFT
• MEA fabrication/Fuel cell and electrolysis testing

Would like to know more about (regarding AEMs):
• Current efforts
• Recent (non-public) advances

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Flow batteries/electrodialysis as they avoid carbon dioxide and hydroxide concerns
Although fuel cells and electrolyzers have larger upside
Company Objective:

• Comercialisation of ‘Low Cost’ Alkaline Fuel Cell Technology

Strategy and Applications:

• Focus on industrial sector

• Primary market: Chlor-Alkali, where hydrogen availability is plentiful

Conference Objective

• Understand more about AEMs with a view to possible inclusion within electrode architectures
Keith Scott (Newcastle University) k.scott@newcastle.ac.uk

- Modelling and Optimisation
- Functional materials for membranes and electrocatalysts
- Mechanisms of transport and electron transfer
- Cell testing and Application

Would like to know more about (regarding AEMs):
- Temperature stable ionomers
- Transport mechanisms

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?
Electrolysers and fuel cells- low cost of materials
Alkaline batteries
Research interests:
• Synthesis and characterisation of mixed metal oxides
• Electrode Materials
• Structural studies of fuel cell materials

Techniques:
• Synthetic methodologies
• X-ray and neutron diffraction
• Conductivity studies

Would like to know more about (regarding AEMs):
• New electrode materials
• CO₂ utilisation

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Fuel Cell applications: - efficient electricity production
CO₂ utilisation: - sustainable C neutral society
John Varcoe (University of Surrey) j.varcoe@surrey.ac.uk

Research interests:
• Polymer electrolytes
• Membrane characterisation
• Fuel cells, redox flow batteries, reverse electrodialysis cells
• Electrocatalyst studies in alkaline aqueous electrolytes

Techniques:
• Titrations
• Raman/IR/Solid State NMR
• Voltammetry (including RRDE)

Would like to know more about (regarding AEMs):
Cationic head-groups that:
- are alkali stable
- give very conductive AEMs
- don't affect electrocatalysts

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Water purification technologies:
Do not need to be alkaline stable
Research interests:
• Fuel cells
• Polymer electrolytes for AEMs

Techniques:
• Grafting Pre-ionized Monomers from macro-initiator by ATRP
• Development of AEMs by Ionically cross-linking

Liang Wu (University of science and Technology of China) liangwu8@ustc.edu.cn

Would like to know more about (regarding AEMs):
• OH⁻ transport mechanism
• Alkaline stability

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Electrochemical impedance spectroscopy for in-plane and through-plane OH⁻ conductivities of AEMs is required to evaluate membrane performances in practical fuel cell application.
Tongwen Xu (University of science and Technology of China) twxu@ustc.edu.cn

Research interests:
• Fuel cells
• Polymer electrolytes for membranes
• Membrane separation processes, such as electrodialysis, diffusion dialysis….

Techniques:
• Polyacylation from Pre-ionized Monomers for AEMs
• Grafting Pre-ionized Monomers from macro-initiator by ATRP
• Solvent-free synthesis of AEMs

Would like to know more about (regarding AEMs):
• OH⁻ transport mechanism
• Alkaline stability

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Electrochemical impedance spectroscopy is an powerful technology for in-situ characterization of MEA performance.
Yushan Yan (University of Delaware) yanys@udel.edu

Research interests:
• Electrochemical energy conversion/storage
• Membranes and catalysts
• Zeolite thin films/coatings

Techniques:
• RDE
• MEA

Would like to know more about (regarding AEMs):
• OH⁻ conduction mechanism
• HEM stability
• HOR catalysts for HEMFC

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
Fuel cells
Electrolyzers
Redox flow batteries
Solar hydrogen devices
Lin Zhuang  (Wuhan University)  lzhuang@whu.edu.cn

Research interests:
• electrochemical energy conversion and storage
• alkaline polymer electrolyte

Techniques:
• spectroscopy (UV-vis, IR, MS, AFM, SAXS, EIS, etc.)
• computational modelling

Would like to know more about (regarding AEMs):
• new design of cation
• chemical stability

Opinion on which electrochemical technology is most appropriate for AEMs (and why)?:
electrochemical devices: fuel cell, water electrolysis, redox flow cell, alkaline battery, sensor
(simplifies the structure, and enhances the power density)
Energy & Environmental Science
Linking all aspects of energy conversion and storage, alternative fuel technologies and global environmental science

A community-spanning journal bringing researchers together
Wide international readership covering academia and industry
Publishing agenda-setting, high quality science from leading international groups

Record high Impact Factor – 11.65

Submit your best research today: www.rsc.org/ees
Energy & Environmental Science

is proud to sponsor
Anion-Exchange Membranes for
Energy Generation Technologies

www.rsc.org/ees
Submit your best research
Energy & Environmental Science
Linking all aspects of energy conversion and storage, alternative fuel technologies and global environmental science

Energy & Environmental Science is proud to sponsor “Anion-Exchange Membranes for Energy Generation Technologies”

Submit your best research today:
www.rsc.org/ees

Follow us on our blog: http://blogs.rsc.org/ee/
Energy & Environmental Science

• A community-spanning journal bringing researchers together

• Publishing agenda-setting, high quality science from leading international groups

• Wide international readership covering academia and industry

• High Impact Factor 11.65

@EES_journal
Anion-exchange membranes for alkaline polymer electrolyte fuel cells: comparison of pendent benzyltrimethylammonium- and benzylimethylimidazolium-head-groups
Oliver I. Deavin, Sam Murphy, Ai Lien Ong, Simon D. Poynton, Rong Zeng, Henryk Herman and John R. Varcoe
DOI: 10.1039/C2EE22466F, Paper

Non-precious Co3O4 nano-rod electrocatalyst for oxygen reduction reaction in anion-exchange membrane fuel cells
Jianbo Xu, Ping Gao and T. S. Zhao
DOI: 10.1039/C1EE01431E, Paper

Comb-shaped polymers to enhance hydroxide transport in anion exchange membranes
Nanwen Li, Tingzi Yan, Zheng Li, Thomas Thurn-Albrecht and Wolfgang H. Binder
DOI: 10.1039/C2EE22050D, Communication