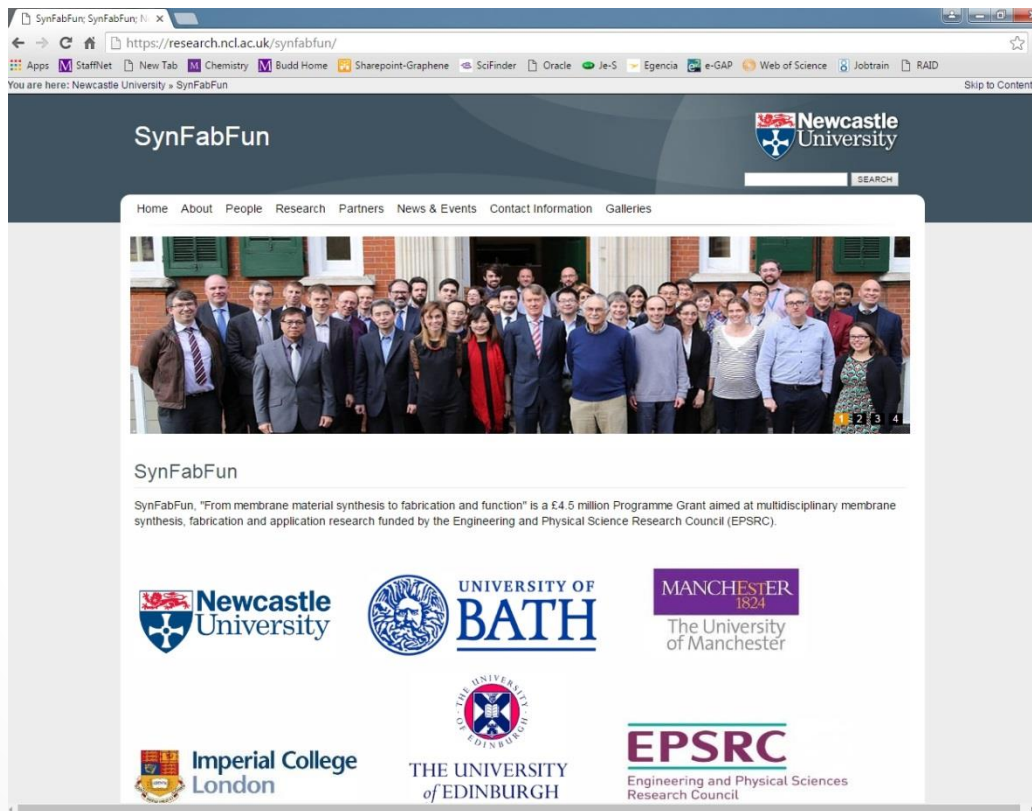


# SynFabFun

From membrane material synthesis  
to fabrication and function

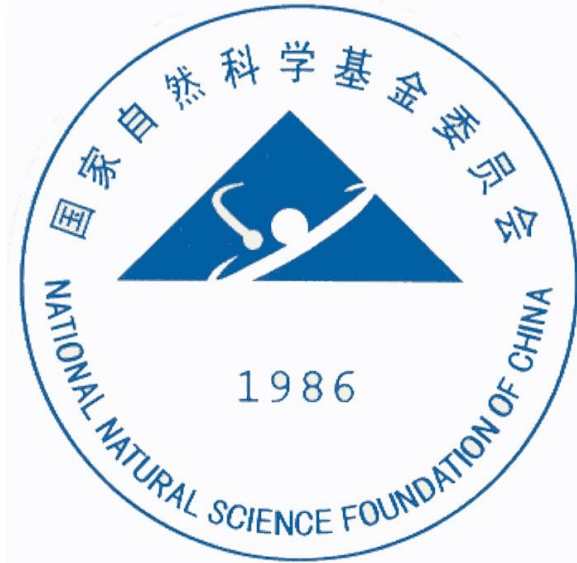


The screenshot shows the SynFabFun website homepage. At the top, there is a navigation bar with the SynFabFun logo and the Newcastle University logo. Below the navigation bar is a search bar and a menu with links to Home, About, People, Research, Partners, News & Events, Contact Information, and Galleries. The main content area features a large group photograph of the project team. Below the photo, the text reads: "SynFabFun" followed by a description: "SynFabFun, 'From membrane material synthesis to fabrication and function' is a £4.5 million Programme Grant aimed at multidisciplinary membrane synthesis, fabrication and application research funded by the Engineering and Physical Science Research Council (EPSRC)." At the bottom of the page, there are logos for the partner institutions: Newcastle University, University of Bath, The University of Manchester, Imperial College London, The University of Edinburgh, and EPSRC (Engineering and Physical Sciences Research Council).

<https://research.ncl.ac.uk/synfabfun/>



英国文化教育协会  
英国大使馆文化教育处



RESEARCHER  
LINKS



**Newton  
Fund**



MANCHESTER  
1824

The University  
of Manchester



Imperial College  
London

# SynFabFun



THE UNIVERSITY  
*of* EDINBURGH



UNIVERSITY OF  
**BATH**



# SynFabFun

Our vision is to create membranes which do not suffer from ageing or fouling, and for which separation functionality is therefore maintained over time.

We will achieve this through a combination of the synthesis of new membrane materials and fabrication of novel membrane composites (polymeric, ceramic and hybrids), supported by new characterisation techniques.

**EPSRC**

Engineering and Physical Sciences  
Research Council

**Programme Grant**

**EP/M01486X/1**

**1 April 2015 – 30 September 2020**



# SynFabFun

Our ambition is to change the way the global membrane community perceives performance.

Through the demonstration of membranes with immortal performance, we seek to shift attention away from a race to achieve ever higher initial permeability, to creation of membranes with long term stable performance which are successful in industrial application.

**EPSRC**

Engineering and Physical Sciences  
Research Council

**Programme Grant**

**EP/M01486X/1**

**1 April 2015 – 30 September 2020**



**Ian Metcalfe**

SynFabFun Director



**POSTDOCTORAL**

Greg Mutch

Georgios Triantafyliou

Dragos Neagu

**PhD**

Maria Kazakali





**Andrew Livingston**  
SynFabFun Deputy Director



**Imperial College  
London**



**Kang Li**



**Associated Academic Staff**  
Qilei Song

**POSTDOCTORAL**

- Tian Yin Liu
- Tao Li
- Bo Wang
- Kang Huang

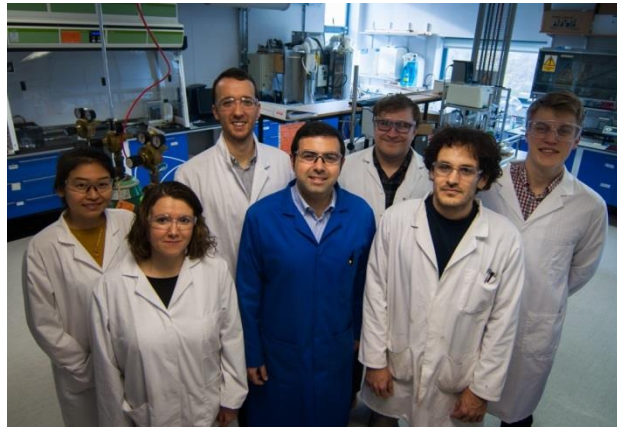




**Davide Mattia**



**John Chew**



**Darrell Patterson**  
**IN MEMORIAM**

**POSTDOCTORAL**

Jing Ji (presenting)

Saeed Mazinani

Nicholas Low (left)

**PhD**

Serena Casanova

Abouther Al-Shimmery





**Neil McKeown**

**POSTDOCTORAL**

Richard Malpass-Evans

**PhD**

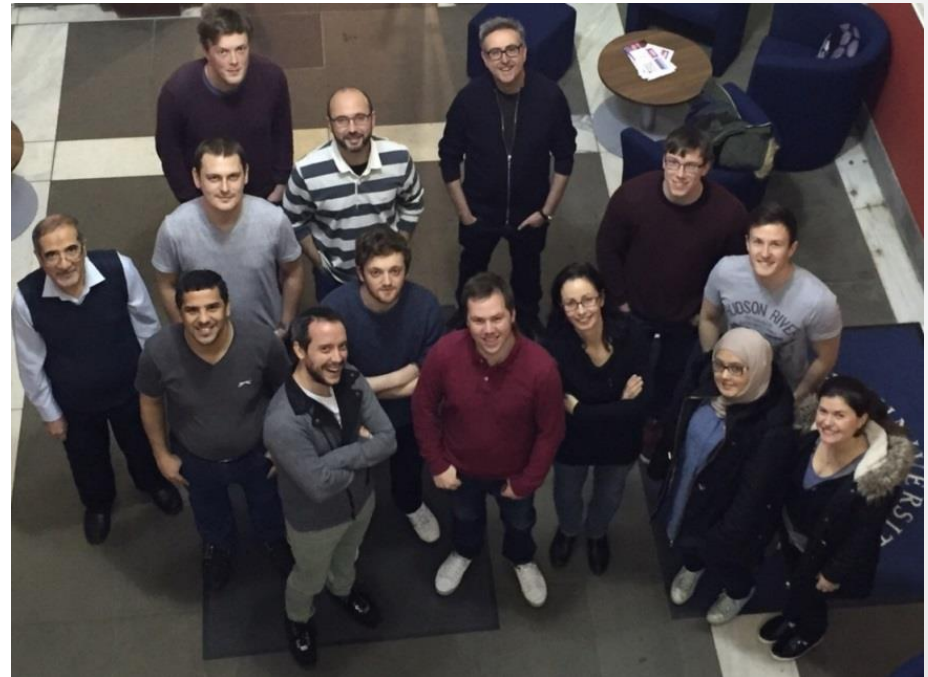
Hannah McDermott

**Associated Academic Staff**

Maria Chiara-Ferrari



THE UNIVERSITY  
*of* EDINBURGH





**Peter Budd**



**POSTDOCTORAL**  
Andrew Foster

**PhD**  
Marzieh Tamaddondar

**Associated Academic Staff**  
Patricia Gorgojo  
Gyorgy Szekely



**Richard Court**

SynFabFun Programme Manager

# SynFabFun

## ADVISORY BOARD

### INDUSTRIAL

Andrew Boam (Evonik)

Mike Muskett (BP)

Andrew Rutter (GSK)

Dr. Dhaval Bhandari (Exxon Mobil)

### ACADEMIC

George Belfort (Rensselaer Polytech. Inst.)

Joao Crespo (Uni. Nova de Lisboa)

Marc Olivier Coppens (UCL)

Mathias Ulbricht (Uni. Duisburg-Essen)

Henny Bouwmeester (Uni. Twente)

### EPSRC



*Ideas Workshop, Pott Shrigley*

*22-24 March 2017*

# SynFabFun



PERVATECH



Scottish  
Water  
Always serving Scotland



Johnson Matthey



ExxonMobil - Research & Engineering

# Work Packages

WP 1 : Polymeric membranes

WP 2 : Hybrid membranes

WP 3 : Ceramic membranes

WP 4 : Membrane characterisation



# Publications

nature  
materials

ARTICLES

PUBLISHED ONLINE: 2 MAY 2016 | DOI: 10.1038/NMAT4638

## Polymer nanofilms with enhanced microporosity by interfacial polymerization

Maria F. Jimenez-Solomon<sup>1†</sup>, Qilei Song<sup>1†</sup>, Kim E. Jelfs<sup>2</sup>, Marta Munoz-Ibanez<sup>1</sup>  
and Andrew G. Livingston<sup>1\*</sup>

ARTICLES

PUBLISHED ONLINE: 31 JULY 2017 | DOI: 10.1038/NMAT4939

nature  
materials

## Polymer ultrapermeability from the inefficient packing of 2D chains

Ian Rose<sup>1</sup>, C. Grazia Bezzu<sup>1</sup>, Mariolino Carta<sup>1</sup>, Bibiana Comesaña-Gándara<sup>1</sup>, Elsa Lasseguette<sup>2</sup>, M. Chiara Ferrari<sup>2</sup>, Paola Bernardo<sup>2</sup>, Gabriele Clarizia<sup>3</sup>, Alessio Fuoco<sup>3</sup>, Johannes C. Jansen<sup>3</sup>, Kyle E. Hart<sup>4</sup>, Thilanga P. Liyana-Arachchi<sup>5</sup>, Coray M. Colina<sup>5</sup> and Neil B. McKeown<sup>1\*</sup>

Energy &  
Environmental  
Science



COMMUNICATION

View Article Online  
View Journal | View Issue



Cite this: *Energy Environ. Sci.*,  
2016, 9, 3682

Received 2nd September 2016,  
Accepted 4th November 2016

DOI: 10.1039/c6ee02562e

## A highly-robust solid oxide fuel cell (SOFC): simultaneous greenhouse gas treatment and clean energy generation†

T. Li,<sup>a</sup> M. F. Rabuni,<sup>a</sup> L. Kleiminger,<sup>a</sup> B. Wang,<sup>a</sup> G. H. Kelsall,<sup>a</sup> U. W. Hartley<sup>b</sup> and  
K. Li<sup>a\*</sup>



ELSEVIER

Contents lists available at ScienceDirect

# Journal of Membrane Science

journal homepage: [www.elsevier.com/locate/memsci](http://www.elsevier.com/locate/memsci)



## Perspective on 3D printing of separation membranes and comparison to related unconventional fabrication techniques



Ze-Xian Low<sup>a</sup>, Yen Thien Chua<sup>a</sup>, Brian Michael Ray<sup>a</sup>, Davide Mattia<sup>a</sup>, Ian Saxley Metcalfe<sup>b</sup>, Darrell Alec Patterson<sup>a,\*</sup>

## Morphology, performance and stability of multi-bore capillary $\text{La}_{0.6}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_{3-\delta}$ oxygen transport membranes

Yunsi Chi<sup>a,b</sup>, Tao Li<sup>a,b</sup>, Bo Wang<sup>a,b</sup>, Zhentao Wu<sup>b,c</sup>, Kang Li<sup>a,b,\*</sup>

## Molecular weight cut-off determination of organic solvent nanofiltration membranes using poly(propylene glycol)

Christopher John Davey<sup>a,b</sup>, Ze-Xian Low<sup>b,c</sup>, Remigius H. Wirawan<sup>a</sup>, Darrell Alec Patterson<sup>a,b,c,\*</sup>

## High-flux PIM-1/PVDF thin film composite membranes for 1-butanol/water pervaporation

Lei Gao<sup>a</sup>, Monica Alberto<sup>b</sup>, Patricia Gorgojo<sup>b</sup>, Gyorgy Szekely<sup>b</sup>, Peter M. Budd<sup>a,\*</sup>



Contents lists available at ScienceDirect

Journal of Membrane Science

journal homepage: [www.elsevier.com/locate/memsci](http://www.elsevier.com/locate/memsci)



## Fouling resistant 2D boron nitride nanosheet – PES nanofiltration membranes

Ze Xian Low<sup>a,b</sup>, Jing Ji<sup>b</sup>, David Blumenstock<sup>b</sup>, Yong-Min Chew<sup>b</sup>, Daniel Wolverson<sup>c</sup>,  
Davide Mattia<sup>b</sup>

<sup>a</sup> Department of Chemical Engineering, Monash University, Clayton, VIC 3800, Australia

<sup>b</sup> Centre for Advanced Separations Engineering and Department of Chemical Engineering, University of Bath, Claverton Down, Bath BA2 7AY, UK

<sup>c</sup> Centre for Nanoscience and Nanotechnology and Department of Physics, University of Bath, Claverton Down, Bath BA2 7AY, UK





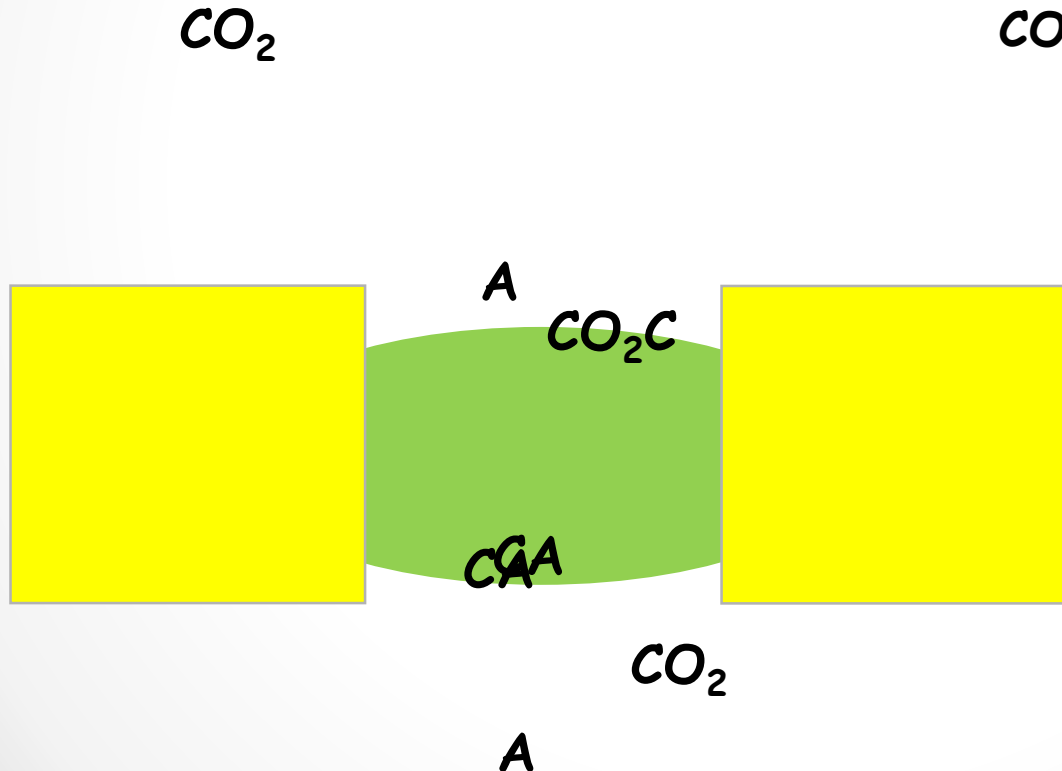
# Dual phase membranes for up-hill $\text{CO}_2$ permeation

**A:** counter-permeating gas

**C:** carrier as  $\text{CA}$  or  $\text{CO}_2\text{C}$

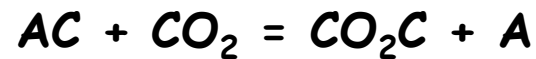
$\text{CO}_2$ : dilute feed

Greg Mutch will talk about  
this class of membrane



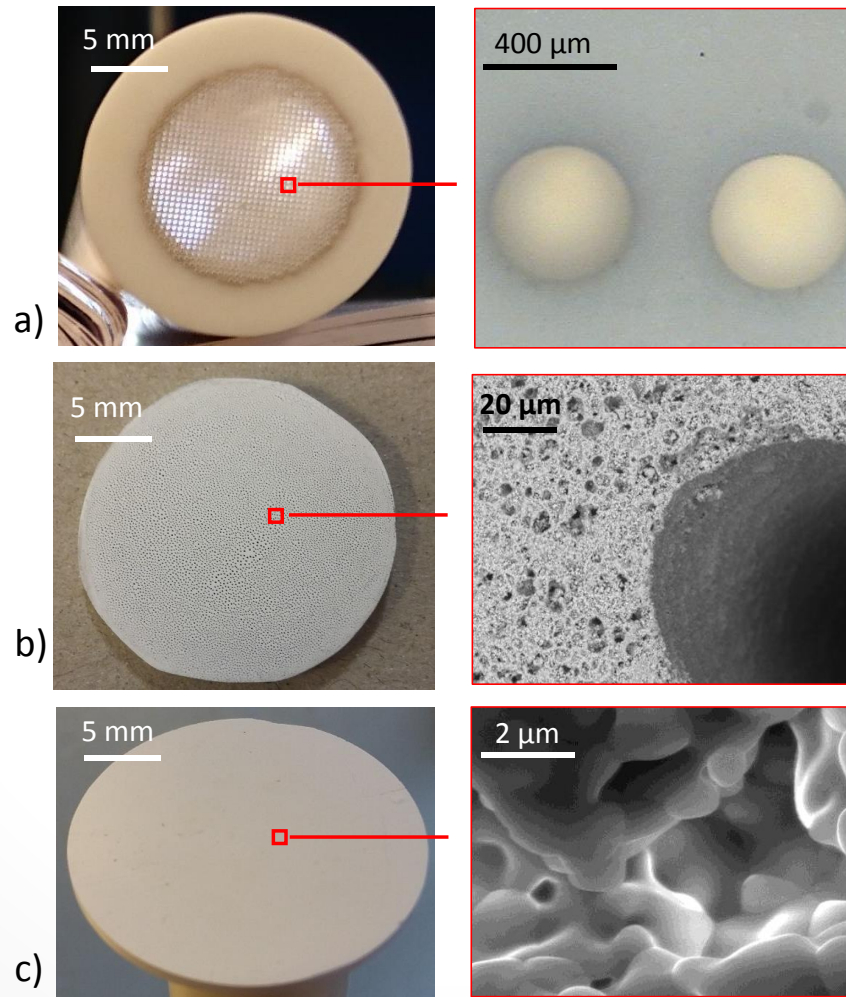
# Dual phase membranes for uphill CO<sub>2</sub> permeation

$$\begin{pmatrix} \dot{J}_i \\ \dot{J}_j \end{pmatrix} = \begin{pmatrix} L_{ii} & L_{ij} \\ L_{ji} & L_{jj} \end{pmatrix} \begin{pmatrix} \nabla \mu_i \\ \nabla \mu_j \end{pmatrix}$$

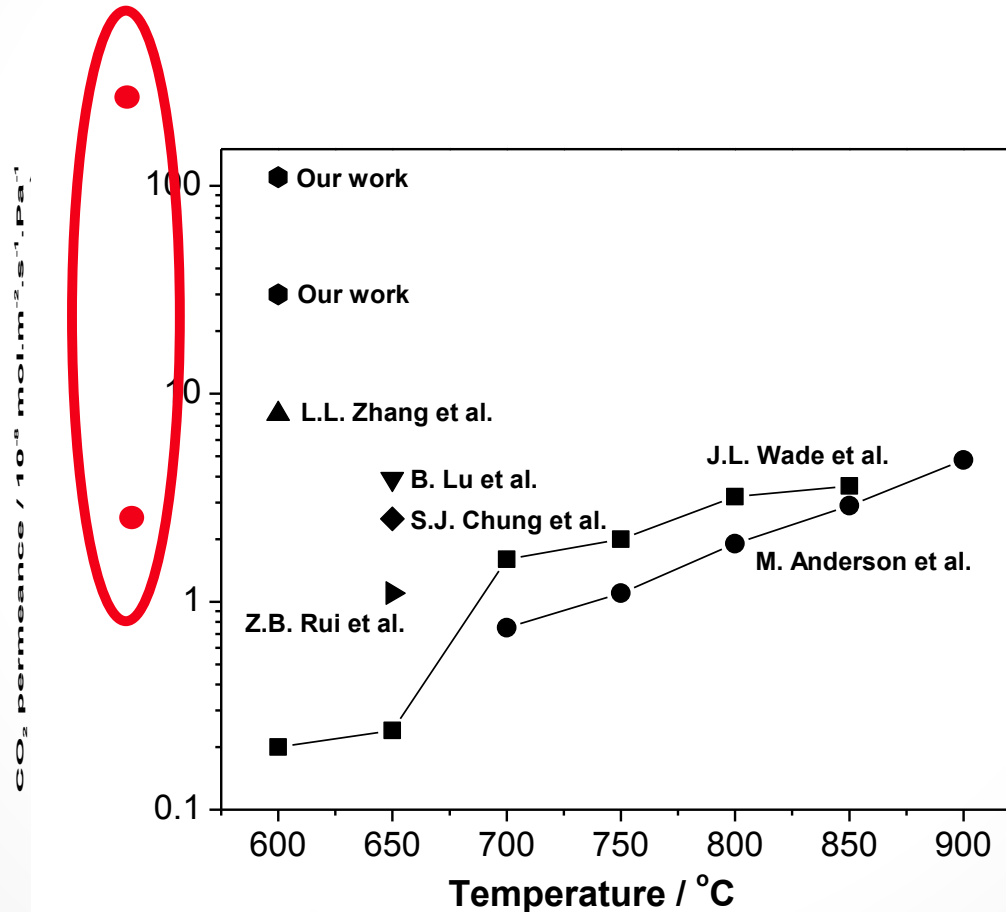


$$\frac{P_{CO_2,P}}{P_{CO_2,F}} < \frac{P_{A,F}}{P_{A,P}}$$

# Dual phase membranes for uphill CO<sub>2</sub> permeation



# Dual phase membranes for uphill CO<sub>2</sub> permeation



## ICOM2020 - Status

- Scheduled for 12-17 July 2020.
- Website active <http://icom2020.co.uk/>
- Abstracts due January 2020.

Role	Personnel
Chairs	Davide Mattia, University of Bath Kang Li, Imperial College London Andrew Livingston, Imperial College John Chew, University of Bath
Committee Members	Peter Budd, University of Manchester Robert Field, University of Oxford Ian Metcalfe, Newcastle University Neil McKeown, University of Edinburgh
European Membrane Society Representatives	Bart van der Bruggen, Katholieke Universiteit Leuven, Belgium Antoine Kemperman, University of Twente, Netherlands



# Acknowledgements

**Dr Greg Mutch, Dr Dragos Neagu, Dr Evangelos Papaioannou, Ms Sotiria Tsochataridou**

**Dr Richard Court**

**<https://research.ncl.ac.uk/iontransport/research/>**

**EPSRC**

Engineering and Physical Sciences  
Research Council



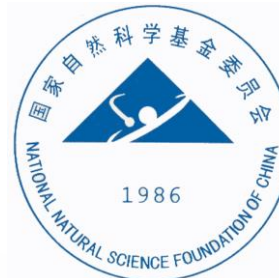
**European Research Council**

**BRITISH  
COUNCIL**

英国文化教育协会  
英国大使馆文化教育处

**BRITISH  
COUNCIL**

**RESEARCHER  
LINKS**



**Newton  
Fund**

**END**