Program
Armen SCPC-MS triggering collection of your target compound:
Example of purification of Piperine from crude black pepper extract by SCPC-MS

Armen SCPC system
- Liquid – liquid chromatography purification
- SCPC column size available: 50 mL, 100 mL, 250 mL, 1000 mL, 5000 mL, custom size
- From simple column to complete automated system with dedicated software
- Ultra-fast separation
- Automated solvent system generation

Armen Instrument : ZI de Kermeñen - 16, rue Ampère - 56890 St-Avé (France)
Phone +33(0)2 97 61 84 00 – Fax +33(0)2 97 61 85 00
contact@armen-instrument.com / www.armen-instrument.com
New semi-prep HSCCC TBE-300V

The Best Performance Semi-Preparative HSCCC Ever in the History of HSCCC

TBE-300V is dedicated for separation and purification of large molecules, like proteins, polypeptides and polysaccharides.

**Product Features**

- Specially optimized for aqueous two-phase extraction and purification of proteins and polypeptides
- Higher separation efficiency: the separation efficiency is as high as an analytical HSCCC
- Triple Separation Column: When revolving at high speed the machine can reach a perfect balance.
- Dual i-way valve design: Without stop the machine the operator can switch the running mode with ease.
- Precise temperature control: Maintain the bioactivity of large molecules.
- Higher retention: the retention of the stationary phase of various aqueous two-phase systems is increased from 25% to 110%.

**Separation Example**

Separation of a mixture of three proteins

Solvent system: 15% PEG 1000:15% dH2O

Contact us

E-mail: export@tautochinese.com
Tel: +86 21 51329599 EXT. 8025
The Loop is the heart of Chicago. Every day, thousands of Chicagoans rely on the efficiency of the public rail system (“The L” for short). More often than not, their trip on The L will take them through The Loop, a set of concentric tracks that facilitates the passage of six train routes. Through the eyes of a chromatographer, the Chicago Loop mirrors the elegance of Countercurrent Chromatography: trains speed by in opposite directions and commuters transfer between routes until ultimately, they reach their respective destinations. We look forward to this exchange of ideas and extend a warm welcome to our great city.

Logo concept by Laura Gauthier, UIC
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Organizers
CHAIR  Brent Friesen (Dominican University)
CO-CHAIR  Guido Pauli (University of Illinois at Chicago)

Local Organizing Committee
Jim McAlpine (University of Illinois at Chicago)
Shao-Nong Chen (University of Illinois at Chicago)
Lucas Chadwick (Bell’s Brewery, Michigan)
Jonathan Bisson (University of Illinois at Chicago)
Charlotte Simmler (University of Illinois at Chicago)
Dan Kulakowski (University of Illinois at Chicago)
Birgit Jaki (University of Illinois at Chicago)
David Lankin (University of Illinois at Chicago)
Samuel Pro (Wrightwood Technologies)

Local Scholars Committee from the University of Illinois at Chicago
Laura Gauthier
Rasika Phansalkar
Amandine Nachtergael
Yang Liu
Yang Yu
Mary Choules
I-Soo Youn
Edyta Grzelak
Gonzalo Malca
**Venue and Arrangements**

**WORKSHOP**
Saturday July 30 – Sunday July 31 2016
The workshop will be held in the Physical Science Department facility on the 3rd floor of Parmer Hall. Room 331.

**OPENING RECEPTION**
Sunday, July 31 at 7:00 PM The opening reception will be held in the Noonan reading room on the second floor of Lewis Hall. (7 on campus map).

**CONFERENCE**
Monday, August 1 – Wednesday, August 3 2016
The conference, poster sessions, and Exhibition will be held in the Parmer Hall atrium. See (11) on campus map.

**LUNCHES**
Lunch will be provided for the workshop attendees on both Saturday and Sunday in the Parmer Hall 3rd floor student commons.
On conference days (Monday, Tuesday, & Wednesday) lunch will be served in the Parmer Hall atrium where the poster sessions and Exhibition are being held.

**DINNERS**
Sunday evening’s reception will be held in the Noonan Reading room in Lewis Hall Monday, the dinner will be held in the Dominican University quad (14 on campus map) next to the social hall (9 on campus map).
Tuesday, the dinner will be part of the City of Chicago outing (see SOCIAL PROGRAM).

**CONFERENCE DINNER**
The conference dinner, Wednesday August 3rd, will be held in the Parmer Hall atrium. The social hour start at 6 PM followed by the dinner at 7 PM at the same location.

**SOCIAL PROGRAM**
On Tuesday, August 2nd, there will be an evening visit to downtown Chicago. Transport will be provided to take delegates to Chicago and return them to either the Carlton hotel or Dominican University.
Program

Pre-conference – Sunday July 31, 2016

Opening Reception
(Su) 7:00p Opening reception in Noonan reading room on the 2nd floor of Lewis Hall

Day 1 – Monday August 1, 2016

Conference Opening
(Mo) 08:30 Registration
(Mo) 09:00 Jeff Breese - Provost and VP of Academic Affairs of Dominican University
Welcome to Chicago and DominicanUniversity
(Mo) 09:05 Brent Friesen & Guido Pauli- Cochairs of CCC2016
What is hot in the CCC Loop?

Session I – Natural Products I

Chairs: Ian Sutherland & Yoichiro Ito

(Mo) 09:35 FO Gerold Jerz (Braunschweig, Germany)
Mass-spectrometric separation strategies for the guided recovery of
genotoxic pyrrolizidine alkaloids from plant and food sources using all-
liquid chromatography techniques

(Mo) 10:00 SO Krystyna Skalinka-Woźniak (Lublin, Poland)
Hyphenated HPCCC and HPLC/DAD/ESI-TOF as
a platform for searching of biologically active coumarins from Apiaceae
plants

(Mo) 10:13 FP Yaoguang Liang (Zhongshan, China)
Rapid purification and scale-up separation of three makamides from
Lepidium meyenii using high-capacity high-speed counter-current
chromatography

10:17 – 10:47 Tea & Coffee, Posters (odd numbers) & Exhibition
Session II – Natural Products II

*Chairs: Alain Berthod & Peter Hewitson*

Session Sponsor: Armen Instrument (St. Avé, France)

<table>
<thead>
<tr>
<th>Time</th>
<th>Type</th>
<th>Speaker</th>
<th>Location</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Mo) 10:47</td>
<td>FO</td>
<td>Karine Faure (Lyon, France)</td>
<td>Lyon, France</td>
<td>Comprehensive two-dimensional CPC-LC: providing analytical and preparative separations systems for complex Edelweiss extracts</td>
</tr>
<tr>
<td>(Mo) 11:12</td>
<td>SO</td>
<td>David Ward (Uxbridge, UK)</td>
<td>Uxbridge, UK</td>
<td>Purification of monosaccharides from crude hydrolysed sugar beet pulp for the production of sustainable chemical feedstocks</td>
</tr>
<tr>
<td>(Mo) 11:25</td>
<td>SO</td>
<td>Gregoire Audo (Vannes, France)</td>
<td>Vannes, France</td>
<td>Preparative separation of marine bioactive compounds by centrifugal partition chromatography</td>
</tr>
<tr>
<td>(Mo) 11:38</td>
<td>FP</td>
<td>Gerold Jerz (Braunschweig, Germany)</td>
<td>Braunschweig, Germany</td>
<td>Recovery of antibacterial cystobactamids from <em>Cystobacter</em> sp. by HPCCC and off-line ESI-MS/MS metabolite profiling</td>
</tr>
<tr>
<td>(Mo) 11:42</td>
<td>FP</td>
<td>Jizhong Yan (Hangzhou, China)</td>
<td>Hangzhou, China</td>
<td>Separation of isomeric monosaccharides by recycling elution-extrusion countercurrent chromatography</td>
</tr>
<tr>
<td>(Mo) 11:46</td>
<td>FP</td>
<td>Shengqiang Tong (Hangzhou, China)</td>
<td>Hangzhou, China</td>
<td>Enantioseparation of aromatic acids by precolumn derivatization countercurrent chromatography</td>
</tr>
</tbody>
</table>

12:00 – 1:30 Lunch, Posters & Exhibition
Session III – Natural Products III

**Chairs: Tianyou Zhang & Svetlana Ignatova**

(Mo) 01:30   FO  Shihua Wu (Hangzhou, China)
On-demand purification of natural products by counter-current chromatography

(Mo) 01:55   SO  Ian Sutherland (Uxbridge, UK)
The role of counter-current chromatography in the modernisation of traditional Chinese medicines: 8 years on

(Mo) 02:08   SO  Xueli Cao (Beijing, China)
Separation and research of anti-tumor active components in *Zanthoxylum ailanthoides* Sieb. & Zucc.

(Mo) 02:21   SO  Xiaohua Jiang, Zhenghong Pan, Xiaojie Yan (Guilin, China)
Preparative Isolation of Flavone C-Glycosides from *Peristrophe baphica* by Counter-Current Chromatography Coupled with Other Techniques

(Mo) 02:44   FP  Yun Wei (Beijing, China)
Online enrichment and separation of five flavonoids compounds from *Mikania micrantha* using magnetic nanomaterials coupled with high speed countercurrent chromatography

02:50 – 3:20  Tea & Coffee, Posters (even numbers) & Exhibition

Session IV – Natural Products IV

**Chairs: Jim McAlpine & Karine Faure**

(Mo) 03:20   FO  Qizhen Du (Hangzhou, China)
Preparative separation of sucrose monoesters, diesters and polyesters made of palm oil and sucrose by high-speed countercurrent chromatography

(Mo) 03:45   SO  Tsvetelina Mandova (Paris, France)
Purification of bioactive compounds from *Centaurium erythraea* Rafn. by conventional and new generation designed centrifugal partition chromatography column coupled with MS detector
(Mo) 03:58  SO  Nektarios Aligiannis (Athens, Greece)
A high-throughput procedure based on CPC-fractionation for the
discovery of skin whitening agents from Greek flora extracts

(Mo) 04:11  SO  Gilda Guimaraes Leitão (Rio de Janeiro, Brazil)
Alternating isocratic and gradient elution CCC for the isolation of minor
phenolics from *Ormocarpum kirkii* barks

(Mo) 04:24  SO  Dalene de Beer (Stellenbosch, South Africa)
comprehensive two-dimensional CCCxLC analysis for improved
separation of Rooibos polyphenols

(Mo) 04:50  SO  Rasika Phansalkar (Chicago, IL USA)
Centrifugal partition chromatography (CPC) enriches dentin-bioactive
trimeric and tetrameric proanthocyanidins from medicinal plants

(Mo) 5:03  FP  Marcela Elizabeth Castro-Benítez (Bogotá, Columbia)
Isolation and characterisation of chlorophylls and xanthophylls in grass by
a novel solvent system using countercurrent chromatography

(Mo) 5:07  FP  Gerold Jerz (Braunschweig, Germany)
Fractionation of bisdesmodic saponins with anti-tumor enhancing activity
from *Saponaria officinalis* by HPCCC, use of natural chiral selectors and
monitoring by off-line ESI-MS/MS injections

(Mo) 5:11  FP  Edy Sousa de Brito (Ceará, Brazil)
Value of $K$ for application of counter-current chromatography in the
isolation of three lipopetide families

5:15  
Group Photo

5:30  
International Committee Meeting

6:00  
Reception &

7:00  
Dinner in Social Hall
Session V – Solvent Systems I

*Chairs: Kazufusa Shinomiya & Martha Knight*

(Tue) 09:00  FO  **Walter Vetter (Stuttgart, Germany)**  
CCC separation strategies for very nonpolar lipid compounds

(Tue) 09:25  FO  **Franziska Bezold (Freising, Germany)**  
Deep eutectic solvent systems in liquid-liquid chromatography

(Tue) 09:50  SO  **Yang Liu (Chicago, IL USA)**  
Matching sweet spots: refining a TLC-based countercurrent solvent system selection strategy

(Tue) 10:03  SO  **Edyta Grzelak (Chicago, IL USA)**  
Bio-GUESS based countercurrent separation of anti-tuberculosis lead compounds from Actinomycetes

10:17 – 10:47  **Tea & Coffee, Posters (even numbers) & Exhibition**
Session VI – Solvent Systems II

**Chairs: Qizhen Du & Guy Harris**

(Tue) 10:47 KO  **John MacMillan (Dallas TX, USA)**
High-Throughput Functional Annotation of Natural Products

(Tue) 11:27 FP  **Svetlana Ignatova (Uxbridge, UK)**
Development of a counter-current chromatography-based extraction method for emerging contaminants from river water

(Tue) 11:31 FP  **Gilda Guimaraes Leitão (Rio de Janeiro, Brazil)**
Countercurrent separation of natural products: verbenone from rosemary essential oil

(Tue) 11:35 FP  **Duo-Long Di (Lanzhou, China)**
Three solvent system CCC combined the use of O-carboxymethyl chitosan as an additive for separation of chemical components in *Lycium barbarum* L.

(Tue) 11:39 FP  **Aihua Peng (Chengdu, China)**
Quick selection of solvent system for counter-current chromatography separation with one simple HPLC method

(Tue) 11:41 FP  **Emma Brace (West Lafayette, IN USA)**
Enhancing silymarin fractionation using the conductor-like screening model for real solvents

(Tue) 11:45 FP  **Amandine Nachtergael (Chicago, IL USA)**
Probing the combinatorial metabolome of flavanolignans in milk thistle (*Silybum marianum* L.)

(Tue) 11:49 FP  **Franziska Bezold (Freising, Germany)**
Tocopherol separation with deep eutectic solvent-based biphasic systems

12:00 – 1:30  **Lunch, Posters & Exhibition**
Session VII – Large & Industrial Scale

*Chairs: Xueli Cao & Gerold Jerz*

Session Sponsor Dynamic Extractions (Gwent, UK)

(Tue) 01:30  SO  Laszlo Lorantfy (Dabas, Hungary)
What is Industrial Scale in CPC?

(Tue) 01:43  FO  Jean-Hugues Renault (Reims, France)
Process intensification and scale-up in pH-zone refining CPC: study case of the purification of alkaloids from *Catharanthus roseus*

(Tue) 02:08  FO  Guy Harris (Gwent, UK)
Pilot scale purification of xanthophylls for D-Factory using CCC

(Tue) 02:33  SO  Fernanda das Neves Costa (Rio de Janeiro, Brazil)
*Schinus terebinthifolius* scale-up: CCC method transfer to CPE and CPC

(Tue) 02:46  FP  Apostolis Angelis (Athens, Greece)
A new process for the analysis of mastic gum and isolation of bioactive triterpens and polymer

02:50 – 03:20  Tea & Coffee, Posters (odd numbers) & Exhibition
Session VIII – Applications I

*Chairs: Gilda Guimarães Leitão & Yue Hugh Guan*

(Tue) 03:20  SO  Raena Morley (Freising, Germany)
Model-based design of a sequential centrifugal partition chromatography process for the preparative batch separation of ternary mixtures

(Tue) 03:33  FP  Shihua Wu (Hangzhou, China)
Strategy for pH-dependent tailing in CCC: alkaloids of *Nelumbo nucifera* GAERTN as examples

(Tue) 03:37  FP  Kyoung Jin Lee (Seoul, Korea)
Linear gradient elution in CCC with average speed of target compounds

(Tue) 03:41  FP  David Ward (London, UK)
Scale up purification of monosaccharides from crude hydrolysed sugar beet pulp

4:30  Busses leave for Chicago outing
Day 3 – Wednesday August 3, 2016

Session IX – Columns I

Chairs: Shihua Wu & Adrian Weisz

Session Sponsor: Tauto Biotech (Shanghai, China)

(Wed) 09:00  FO  Michael Englert (Stuttgart, Germany)
Advancement of countercurrent chromatography instrumentation by tubing modifications

(Wed) 09:25  FO  Duo-Long Di (Lanzhou, China)
Melamine modified counter-current chromatography column and its separating mechanism

(Wed) 09:50  SO  Aihua Peng (Chengdu, China)
Novel approach to sample injection in counter-current chromatography: case study of honokiol purification

(Wed) 10:03  FP  Martha Knight (Rockville, MD USA)
The Rotify ® bench-top centrifugal precipitation chromatograph

(Wed) 10:07  FP  Yue Hugh Guan (Shanghai, China)
Rational development of conical columns on J-type counter-current chromatography for protein separation using aqueous-two phase systems

10:17 – 10:47  Tea & Coffee, Posters (odd numbers) & Exhibition
Session X – Columns II

**Chairs: Dalene de Beer & Walter Vetter**

(Wed) 10:47  FO  **Martha Knight (Rockville, MD USA)**  
Spiral countercurrent chromatography in its many forms

(Wed) 11:12  FO  **Yue Hugh Guan (Shanghai, China)**  
Connect fundamentals to applications for counter-current chromatography: new rules, third force, virtual column and scaling-up for protein separation

(Wed) 11:37  FP  **Peter Hewitson (Uxbridge, UK)**  
Additive manufacturing: what can it do for the counter-current chromatography researcher

(Wed) 11:41  FP  **Yue Hugh Guan (Shanghai, China)**  
The working mechanism of toroidal columns on J-type counter-current chromatographs

(Wed) 11:45  FP  **Shihua Wu (Hangzhou, China)**  
Concentric coils for counter-current chromatography

(Wed) 11:49  FP  **Daniel Kulakowski (Chicago, IL USA)**  
K-targeted purification of C-glycosylflavones from *Vitex agnus-castus* by orthogonal countercurrent methods

(Wed) 11:53  FP  **Hiromitsu Aoki (Hiroshima, Japan)**  
Development of precipitation counter-current chromatography

(Wed) 11:57  FP  **Kazumasa Zaima (Chiba, Japan)**  
Comparison of partition efficiency between satellite and planetary motions of coil satellite centrifuge for counter-current chromatographic separation of 4-methylumbelliferyl sugar derivatives

12:00 – 1:30  **Lunch, Posters & Exhibition**
Session XI – Applications II

**Chairs: Jean-Hugues Renault & Fernanda das Neves Costa**

(Wed) 01:30  FO  **Peter Hewitson (Uxbridge, UK)**
The effect of column aspect ratio on separation in counter-current chromatography

(Wed) 01:55  SO  **Marcela Elizabeth Castro-Benítez (Bogotá, Columbia)**
Isolation of tocopherols and tocotrienols as constituents of γ oryzanol in baby banana peels with hyperpigmentation by means of spiral coil-LSRCCC

(Wed) 02:08  SO  **Adrian Weisz (College Park, MD USA)**
Speculations on the formation of a double peak during high-speed counter-current chromatographic separation of an azo dye

(Wed) 02:21  SO  **Laura L. Gauthier (Chicago, IL USA)**
Designer extracts: targeted depletion of metabolites from botanical extracts using countercurrent separation

(Wed) 02:34  FP  **Aihua Peng (Chengdu, China)**
Optimization of sample injection in counter-current chromatography

02:50 – 03:20  **Tea & Coffee, Posters (even numbers) & Exhibition**
Session XII – Theory & Modelling

*Chairs: Krystyna Skalicka-Woźniak & Hiso Oka*

(Wed) 03:20  FO  Gerhard Schembecker (Dortmund, Germany)
Centrifugal partition chromatograph: a continuous multiphase reactor

(Wed) 03:45  FO  Yoichiro Ito (Bethesda, MD USA)
Two-phase motion in hydrodynamic counter-current chromatography: which phase travels toward the head of the coil in hydrodynamic counter-current chromatography?

(Wed) 04:10  SO  Alain Berthod (Lyon, France)
Stationary phase retention in CCC: differences between hydrostatic and hydrodynamic columns

(Wed) 04:23  SO  Léa Marlot (Lyon, France)
K-values in CPC: is prediction reliable?

(Wed) 04:36  FP  Peter Hewitson (Uxbridge, UK)
Computational fluid dynamics modelling of secondary flow in counter-current chromatography instruments

5:00 – 5:30  Closing Remarks

6:00 – 7:00  Cocktail hour

7:00 – 9:00  Conference Dinner

Address by Donna Carroll (President, Dominican University)

Awards Ceremony

Entertainment provided by Roy Schroedl
PO  Krystyna Skalicka-Woźniak (Lublin, Poland)
Preparative separation of bergapten as a novel compound for the treatment of nicotinism

PO  Gerold Jerz (Braunschweig, Germany)
Metabolite profile of betalains and flavonoids from *Opuntia stricta* var. *Dilleni* by HPCCC and off-line ESI-MS/MS

PO  Gerold Jerz (Braunschweig, Germany)
Recovery of the betacyanin celosianin II and flavonoid glycosides from *Atriplex hortensis* var. *rubra* by HPCCC and off-line ESI-MS/MS monitoring

PO  Feriel Bouiche (Lyon, France)
In-situ protein determination to monitor CPC contamination

PO  Karine Faure (Lyon, France)
Production of three new antioxidants from edelweiss by multi-heart cutting CPC-LC

PO  Karine Faure (Lyon, France)
Carnosol purification from *Rosmarinus officinalis* by centrifugal partition chromatography, from laboratory to industry

PO  Gerold Jerz (Braunschweig, Germany)
Fractionation of lipophilic components from potatoes (*Solanum phureja*) by HPCCC and monitoring by off-line injections to APCI-MS/MS

PO  Franziska Bezo (Freising, Germany)
Protein separation using a centrifugal partition extractor

PO  Kyoung Jin Lee (Seoul, Korea)
Relationship between the efficiency and rotation speed in the countercurrent chromatography: separation of cytotoxic metabolites by selective enzymatic transformation

PO  Kwang Ho Song (Seoul, Korea)
Application of counter-current chromatography as a powerful fractionation tool. case study: obtaining gram-scale sesquiterpenoids from *Tussilago farfara*
Preparative separation of euphorbia factors from *Euphorbia lathyris* by countercurrent chromatography

Development of a two-dimensional sequential centrifugal partition chromatography process for the preparative separation of ternary mixtures

Continuous fractionation of multicomponent mixtures with sequential centrifugal partition chromatography

Separation of 5,6-dihydro-α-pyrones from *Hyptis monticola* by high-speed countercurrent chromatography (HSCCC)

Countercurrent chromatography with off-line detection by HPLC-ESI-MS/MS for the separation and identification of saponins from *Ampelozizyphus amazonicus*

Alkaloids from *Triclisia dictyophylla* by pH-zone refining CCC

The role of countercurrent techniques in brewing science: a review

Room temperature ionic liquids-based salting-in strategy for counter-current chromatography

Novel non-aqueous biphasic solvent systems in centrifugal partition chromatography

An integrated process for the recovery of high added-value compounds from extra virgin olive oil using solid-support free liquid-liquid extraction and chromatography techniques
Fernanda das Neves Costa (Rio de Janeiro, Brazil)
Isolation of metabolites from mangrove plant *Rhizophora mangle* by countercurrent chromatography

Grégoire Audo (Saint-Avé, France)
Multiple dual-mode CPC as an efficient tool for the purification of caulerpenyne from *Caulerpa taxifolia*

Grégoire Audo (Saint-Avé, France)
Caulerpenyne from *Caulerpa taxifolia*: a comparative study between CPC and classical chromatographic techniques

Duo-Long Di (Lanzhou, China)
Combining several elution modes to separate compounds from complex matrix

Duo-Long Di (Lanzhou, China)
Separation and purification of active components from *Lycurium barbarum* L. by HSCCC using dual-mode elution

Nektarios Aligiannis (Athens, Greece)
Separation of saponins from *Silene colorata* by using centrifugal partition chromatography

Douglas Armstrong (Bourbonnais, IL USA)
Countercurrent chromatography fractions of plant extracts with anti-tuberculosis activity

Sri Murhandini (Jakarta, Indonesia)
Isolation and purification of α-mangostin from indonesian *Garcinia mangostana* L. rinds using high performance counter-current chromatography

Adrian Weisz (College Park, MD USA)
Separation and identification of a novel subsidiary color of the color additive FD&C red no. 40 (allura red AC) using spiral high-speed counter-current chromatography
International Committee

- Xueli Cao, Beijing, China
- Dalene de Beer, Stellenbosch, South Africa
- Fernanda das Neves Costa, Rio de Janeiro
- Qizhen Du, Hangzhou, China
- J Brent Friesen, River Forest, IL, USA
- Karine Faure, Lyon, France
- Svetlana Ignatova, Uxbridge, UK
- Yoichiro Ito, Bethesda, MD, USA
- Gerold Jerz, Braunschweig, Germany
- Yeong Shik Kim, Seoul, South Korea
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- Gilda Guimaraes Leitão, Rio de Janeiro, Brazil
- Mirjana Minceva, Freising, Germany
- Hisao Oka, Nagoya, Japan
- Guido Pauli, Chicago, IL, USA
- Jean-Hugues Renault, Reims, France
- Kazufusa Shinomiya, Chiba, Japan
- Adrian Weisz, College Park, MD, USA
- Peter Winterhalter, Braunschweig, Germany
- Shihua Wu, Hangzhou, China

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- Alain Berthod, Lyon, France
- Guy Harris, Gwent, UK
- Jim McAlpine, Chicago, USA
- Ian Sutherland, Uxbridge, UK
- Tianyou Zhang, Beijing, China
- Yoichi Shibusawa, Nagoya, Japan
KEY QUESTIONS

Q1  **What** are the **scientific innovations** that will drive the field?
Q2  **What** are the **major obstacles** that hinder the scientific development of CCS?
Q3  **Why** has CCS experienced a **low acceptance rate** among the scientific community?
Q4  **How** can the **low acceptance rate** be **overcome**?
Q5  **How** can we **build community and collaboration** among CCS practitioners?
Q6  **How** can K be **established as an essential physicochemical constant** in the biomedical and other sciences?