

# CCA 2023

*Hilton University of Houston – Houston, TX, USA | April 3 – 6, 2023*

## International Workshop on Coated Conductors for Applications



# CCA 2023 COMMITTEES

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- Prof. Yutaka Yamada – Shanghai Superconductor Technology, Chubu University

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- Venkat Selvamanickam – AMI, TCSUH, Mechanical Engineering, University of Houston

# **International Workshop on Coated Conductors for Applications**

## **CCA2023**

### **Program**

**April 3 – 6, 2023**  
**Hilton University of Houston**  
**Houston, Texas USA**

[\*\*cca2023.me.uh.edu\*\*](https://cca2023.me.uh.edu)



## Program At a Glance

Monday 04/03	Tuesday 04/04	Wednesday 04/05	Thursday 04/06
	7:00 - 8:30 a.m. Breakfast Buffet (SBF*)	7:00 - 8:30 a.m. Breakfast Buffet (SBF*)	7:00 - 8:30 a.m. Breakfast Buffet (SBF*)
	9:00 - 9:30 a.m. Welcome and OPENING SESSION (SB-AB*)	8:40 a.m. - 10:45 a.m. SESSION: Magnet Applications (SB-AB*)	9:00 a.m. - 10:20 a.m. SESSION: Power Applications (SB-AB*)
	9:30 - 11:00 a.m. Plenary Talks	10:45 - 11:00 a.m. Coffee/Tea Break	10:20 - 10:35 a.m. Student Poster Awards
	11:00 - 11:15 a.m. Coffee/Tea Break	11:00 a.m. - 12:05 p.m. SESSION: Magnet Applications - cont'd (SB-AB*)	10:35 - 10:50 a.m. Coffee/Tea Break
	11:15 a.m. - 12:15 p.m. SESSION: Conductor Manufacturing (SB-AB*)	12:05 - 1:05 p.m. Lunch (SB-C*)	10:50 a.m. - Noon SESSION: Power Applications - cont'd (SB-AB*)
	12:15 - 1:30 p.m. Lunch & Group Photo (L-RP*)	1:05 - 3:05 p.m. SESSION: Conductor Materials Research (SB-AB*)	Noon - 1:00 p.m. Lunch Buffet (HV-SBC*)
	1:30 - 3:00 p.m. SESSION: Conductor Manufacturing - cont'd (SB-AB*)	3:05 - 3:20 p.m. Coffee/Tea Break	1:00 - 3:00 p.m. SESSION: Electromagnetic & Electromechanical Properties (SB-AB*)
	3:00 - 3:15 p.m. Coffee/Tea Break	3:20 - 5:20 p.m. SESSION: Conductor Materials Research - cont'd (SB-AB*)	3:00 - 3:15 p.m. Coffee/Tea Break
3:00 - 5:30 p.m. CCA 2023 Registration (Hilton Lobby)	3:15 - 5:40 p.m. SESSION: Compact Fusion (SB-AB*)	5:35 - 7:15 p.m. POSTER SESSION (Hilton Lobby)	3:15 - 4:15 p.m. SESSION: Electromagnetic & Electromechanical Properties - Cont'd (SB-AB*)
5:30 - 7:00 p.m. Welcome Reception (SB-AB*)	6:15 - 6:30 p.m. Buses Load/Depart for Dinner	7:30 - 8:00 p.m. Wine Pairing/ Appetizers (Spec's Wine Lab) Mocktails/Appetizers (Alumni Foyer) 8:00 - 10:00 p.m. Dinner	4:15 - 4:30 p.m. Workshop Summary and 2025 CCA Announcement
	7:00 - 10:00 p.m. CCA Dinner Tribute (The Petroleum Club of Houston)		

**SBF\*** = [All Breakfast served in Hilton Shamrock Ballroom Foyer & Seating in Shamrock Ballroom C]

**HV-SBC\*** = [Lunch Buffet in Hilton Hawaiian Village & Seating in Shamrock Ballroom C]

**L-RP\*** = [M.D. Anderson Library | Rockwell Pavillion, 2nd Floor]

**SB-AB\*** = [All Sessions are in Hilton Shamrock Ballroom AB]

**AF\*** = [Hilton Alumni Foyer, South Lobby]

**SB-C\*** = [Hilton Shamrock Ballroom C]

## PROGRAM OF EVENTS

### MONDAY, April 3

3:00 – 5:30 p.m. **Registration** – First Floor Lobby  
5:30 – 7:00 p.m. **Welcome Reception** – Shamrock Ballroom BC

### TUESDAY, April 4

7:00 – 8:30 a.m. **Breakfast Buffet\*** – Shamrock Ballroom Foyer

9:00 – 9:30 a.m. **OPENING SESSION: Welcome to Houston** – Shamrock Ballroom

9:00 a.m. **Welcome Remarks and Introductions**

Venkat Selvamanickam, M. D. Anderson Chair Professor of Mechanical Engineering; Director, UH Advanced Manufacturing Institute; and Director, Applied Research Hub, Texas Center for Superconductivity at the University of Houston (TcSUH)

#### **Greetings from the University of Houston**

Claudia Neuhauser, Vice Chancellor/Vice President for Research and Technology Transfer

#### **Greetings from the Cullen College of Engineering**

Joseph W. Tedesco, Elizabeth D. Rockwell Dean, Cullen College of Engineering

9:30 – 11:00 a.m. **MORNING SESSION: Plenary Talks**

**Session Chairs:** Lucio Rossi, University of Milano and INFN-Milano LASA Laboratory, Italy  
Teruo Izumi, Advanced Industrial Science and Technology (AIST), Japan

#### **Speakers**

4PL1 **Developing Coated Conductor-based Magnets for Spherical Tokamaks** 9:30 – 10:00  
Rod Bateman, Tokamak Energy, United Kingdom

4PL2 **High Magnetic Field Applications for Coated Conductors** 10:00 – 10:30  
Mark Bird, National High Magnetic Field Laboratory | Florida State University, United States

4PL3 **ASCEND: Cryogenic and Superconducting Powertrain for the Propulsion of Electric Aircraft** 10:30 – 11:00  
Alexandre Colle, Airbus UpNext, France

11:00 – 11:15 a.m. **Coffee | Tea Break**

11:15 a.m. – 12:15 p.m. **MORNING SESSION: Conductor Manufacturing**

**Session Chairs:** Venkat Selvamanickam, University of Houston, United States  
Alexander Usoskin, Renaissance Fusion, France

#### **Speakers**

4CM1 **New Horizons for PLD-based Technology of 2G HTS Tapes** 11:15 – 11:35  
Sergey Lee, Faraday Factory, Japan

*\*All daily breakfast buffets are at your leisure within this time frame.*

11:35 a.m. –  
12:15 p.m.

**SESSION: Conductor Manufacturing** – Continued

- 4CM2 **Coated Conductor R&D at Shanghai Superconductor Technology and Discussion for Fusion Application** 11:35 – 11:55  
Yutaka Yamada, Shanghai Superconductor Technology, China; Chubu University, Japan
- 4CM3 **Homogeneous REBCO Coated Conductor Production Developed by Using IBAD and Hot-wall PLD Process** 11:55 – 12:15  
Yasuhiro Iijima, Fujikura Ltd., Japan

12:15 – 1:30 p.m.

**Lunch & Group Photo** – Rockwell Pavilion, MD Anderson Library - 2nd Floor

1:30 – 3:00 p.m.

**SESSION: Conductor Manufacturing** – Continued

- 4CM4 **Recent Progress in Coated Conductor at SuNAM: Production Scale-up and Customer-oriented Development** 1:30 – 1:50  
Seung Hyun Moon, SuNAM Co. Ltd., South Korea
- 4CM5 **REBCO HTS Wire Manufacturing at SuperPower for High-Field Magnet Applications** 1:50 – 2:10  
Yifei Zhang, SuperPower Inc., United States
- 4CM6 **Production of Technical HTS Wire for Magnet and Cable Applications** 2:10 – 2:30  
Cornelia Hintze, THEVA Dünnschichttechnik GmbH, Germany

**Discussion** – All Speakers 2:30 – 3:00

3:00 – 3:15 p.m.

**Coffee | Tea Break**

3:15 – 5:40 p.m.

**AFTERNOON SESSION: Compact Fusion**

**Session Chairs:** Rod Bateman, Tokamak Energy, United Kingdom  
Seungyong Hahn, Seoul National University, South Korea

**Speakers**

- 4CF1 **HTS Magnets for Fusion Energy** 3:15 – 3:35  
Brandon Sorbom, Commonwealth Fusion Systems, United States
- 4CF2 **HTS Coated Conductors Pave the Way for Stellarators** 3:35 – 3:55  
Paul Harris, Type One Energy Group Inc., United States
- 4CF3 **HTS Coils without HTS Tapes: Direct Deposit and Patterning on Wide Surfaces** 3:55 – 4:15  
Alexander Usoskin, Renaissance Fusion, France
- 4CF4 **Applicability of Large-Current HTS STARS Conductor to the Next-Generation Fusion Experimental Devices** 4:15 – 4:35  
Nagato Yanagi, National Institute for Fusion Science, Japan
- 4CF5 **Coated Conductors and their Application for Compact Fusion** 4:35 – 4:55  
Yuhu Zhai, Princeton Plasma Physics Laboratory (PPPL), United States
- 4CF6 **Further Progress in High Temperature Superconducting Tapes for Practical Use of Superconducting Magnets for Nuclear Fusion Reactors** 4:55 – 5:10  
Arata Nishimura, National Institute for Fusion Science, Japan

**Discussion** – All Speakers 5:10 – 5:40

- 6:15 – 6:30 p.m. **Buses Depart for Dinner** – Hilton front entrance, curbside
- 7:00 – 10:00 p.m. **CCA Dinner Tribute** – The Petroleum Club of Houston  
**80<sup>th</sup> Birthday Dinner Honoring Paul Chu, Herbert C. Freyhardt, and David Larbalestier**  
 TotalEnergies Tower, 1201 Louisiana Street, 35th Floor, Houston, TX 77002  
 (Dress: Business casual; jacket preferred but not required)

### WEDNESDAY, April 5

- 7:00 – 8:30 a.m. **Breakfast Buffet** – Shamrock Ballroom Foyer & C
- 8:40 a.m. – 12:05 p.m. **MORNING SESSION: Magnet Applications** – Shamrock Ballroom
- Session Chairs:** Stephen Gourlay, Fermi National Accelerator Laboratory, United States  
 Mark Bird, FSU/National High Magnetic Field Laboratory, United States
- Speakers**
- 5MA1 **Coated Conductors for Ultra-High-Field NMR Spectrometers** 8:45 – 9:05  
 Robert Herzog, Bruker, Switzerland
- 5MA2 **HTS for Accelerators – Potential and Perspective** 9:05 – 9:25  
 Luca Bottura, CERN, Switzerland
- 5MA3 **Recent Progress and Challenges in REBCO Magnet** 9:25 – 9:45  
 Seungyong Hahn, Seoul National University, South Korea
- 5MA4 **Mid-scale REBCO Coil with “Robust REBCO Coil Concept”** 9:45 – 10:05  
 Satoshi Awaji, Tohoku University, Japan
- 5MA5 **REBCO – A Silver Bullet for Our Future Colliders?** 10:05 – 10:25  
 Xiaorong Wang, Lawrence Berkeley National Laboratory, United States
- 5MA6 **HTS Magnets for Future Accelerators and the IRIS Project** 10:25 – 10:45  
 Lucio Rossi, University of Milano and INFN-Milano LASA Laboratory, Italy
- 10:45 – 11:00 a.m. **Coffee | Tea Break**
- 11:00 a.m. – 12:25 p.m. **SESSION: Magnet Applications** – Continued
- 5MA8 **Latest Development of High-Field Magnets for Compact Fusion Reactors and Particle Accelerators from CORC® Cables and Wires** 11:00 – 11:20  
 Danko van der Laan, Advanced Conductor Technologies, United States
- 5MA9 **A Study on Transverse Resistance of a Non-Insulated Coil Wound with (RE)  $\text{Ba}_2\text{Cu}_3\text{O}_{7-x}$  Coated Conductor in High Magnetic Fields Towards a Specification of Coated Conductors for Use in Magnets** 11:20 – 11:35  
 Jeseok Bang, National High Magnetic Field Laboratory, United States
- Discussion** – All Speakers 11:35 – 12:05
- 12:05 – 1:05 p.m. **Lunch** – Shamrock Ballroom C



1:05 – 5:20 p.m. **AFTERNOON SESSION: Conductor Materials Research**

**Session Chairs:** Bernhard Holzapfel, Karlsruhe Institute of Technology (KIT), Germany  
Yutaka Yamada, Chubu University, Japan

**Speakers**

- 5CMR1 **Ultimate Performance of Industrial YBCO Tapes** 1:05 – 1:25  
Alexander Molodyk, Faraday Factory Japan, Japan
- 5CMR2 **Development of Coated Conductors for Electric Propulsion System of Aircraft** 1:25 – 1:45  
Teruo Izumi, Advanced Industrial Science and Technology (AIST), Japan
- 5CMR3 **Towards a Specification of Coated Conductors for Use in Magnets** 1:45 – 2:05  
David Larbalestier, National High Magnetic Field Laboratory, United States
- 5CMR4 **Customizing Coated Conductors to Enhance Normal Zone Propagation Velocities** 2:05 – 2:25  
Xavier Obradors, ICMAB – CSIC, Spain
- 5CMR5 **Transient Liquid Assisted Growth (TLAG), a Method to Increase Coated Conductors Throughput and Meet Applications Requirements** 2:25 – 2:45  
Teresa Puig, ICMAB – CSIC, Spain
- 5CMR6 **Multilayer BZO/YBCO Thick Films for High Ic in High Fields** 2:45 – 3:05  
Judy Wu, University of Kansas, United States

3:05 – 3:20 p.m. **Coffee | Tea Break**

**Note: Poster Setup** – Hilton Lobby

3:20 – 5:20 p.m. **SESSION: Conductor Materials Research** – Continued

- 5CMR7 **Nanorod-layered Structure Transition in GdBCO Thin Films with BHO Addition** 3:20 – 3:40  
Kaname Matsumoto, Kyushu Institute of Technology, Japan
- 5CMR8 **Status and Prospects of REBCO Conductors for Ultra-High Magnetic Field Applications** 3:40 – 4:00  
Venkat Selvamanickam, University of Houston, United States
- 5CMR9 **The Role of Small Defects on the Degradation of Coated Conductors in Radiation Environments** 4:00 – 4:20  
Michael Eisterer, TU Wien, Atominstitut, Austria
- 5CMR10 **Fluorine-Free MOD REBCO Tape with BaMO<sub>3</sub> (M=Zr, Hf) Artificial Pinning Center** 4:20 – 4:35  
Tatsuoki Nagaishi, Sumitomo Electric Industries, Japan
- 5CMR11 **Are 15% Zr doped ReBCO tapes with the natural spread of Ic as useful as graded Ic tapes with 7.5% Zr doping?** 4:35 – 4:50  
Dmytro Abrahimov, National High Magnetic Field Laboratory, United States

**Discussion** – All Speakers 4:50 – 5:20

5:35 – 7:15 p.m. **POSTER SESSION** – Hilton Lobby

7:30 – 8:00 p.m. **Wine Pairing & Hors d'oeuvres** – Spec's Wine Laboratory

– or –

**Mocktails & Hors d'oeuvres** – Alumni Foyer

8:00 – 10:00 p.m. **Dinner** – Alumni Foyer (Faraday Factory Japan, sponsor)



**Thursday, April 6**

7:00 – 8:30 a.m. **Breakfast Buffet** – *Shamrock Ballroom Foyer*

7:30 – 8:30 a.m. **International Steering Committee Meeting** – *Hawaiian Village*

9:00– 12:00 p.m. **MORNING SESSION: Power Applications** – *Shamrock Ballroom*

**Session Chairs:** Naoyuki Amemiya, Kyoto University, Japan  
Takanobu Kiss, Research Institute of Superconductor Science and Systems,  
Kyushu University, Japan

**Speakers**

- 6PA1 **Application of HTS Coated Conductors to Overhead Power Lines with Distributed, Evaporative, Cryogenic Cooling – Lessons Learned** 9:00 – 9:20  
Franco Moriconi, VEIR Inc, United States
- 6PA2 **US Navy Developments in Large-Scale Superconducting Applications** 9:20 – 9:40  
Peter Ferrara, Naval Surface Warfare Center, Philadelphia Division, United States
- 6PA3 **Development and Needs of Coated Conductors for Air and Space Applications**  
9:40 – 10:00  
Timothy Haugan, U.S. Air Force Research Laboratory, United States
- 6PA4 **Development of Electric Propulsion System for Aircraft by REBCO Superconducting Devices** 10:00 – 10:20  
Masataka Iwakuma, Kyushu University, Japan (presented by Teruo Izumi)

10:20 – 10:35 a.m. **Student Poster Awards**

10:35 – 10:50 a.m. **Coffee | Tea Break**

10:50 a.m. – 12:00 p.m. **SESSION: Power Applications** – Continued

- 6PA5 **Electric Power Grid Applications of Coated Conductors – What is Available and What is Missing?** 10:50 – 11:10  
Sastry Pamidi, FAMU-FSU and the Center for Advanced Power Systems, United States
- 6PA6 **Testing of the HTS Magnets for Wind Generators Using a Performance Evaluation System** 11:10 – 11:30  
Minwon Park, Changwon National University, South Korea (presented by Chang-Hyun Kim)

**Discussion** – All Speakers 11:30 – 12:00

12:00 – 1:00 p.m. **Lunch** – *Hawaiian Village (buffet); Shamrock C (seating)*

1:00 – 4:30 p.m. **AFTERNOON SESSION: Electromagnetic & Electromechanical Properties**

**Session Chairs:** Leonardo Civale, Ret., Los Alamos National Laboratory, United States  
Sastry Pamidi, Center for Advanced Power Systems & FAMU-FSU College of  
Engineering, United States

**Speakers**

- EEP1 **High Throughput Operando Measurements on Current Transport Properties in Long REBCO Coated Conductors and its Contribution to Tape Modeling and Process Optimization** 1:00 – 1:20  
Takanobu Kiss, Kyushu University, Japan

1:20 – 3:00 p.m. **SESSION: Electromagnetic & Electromechanical Properties** – Continued

6EEP2 **Fabrication, Characterizations, and Design Studies of SCSC Cables** 1:20 – 1:40  
Naoyuki Amemiya, Kyoto University, Japan

6EEP3 **Could AC Loss in Coated Conductor Cables Decrease to the Level Acceptable for Pulsed Magnets?** 1:40 – 2:00  
Fedor Gömöry, Slovak Academy of Sciences, Slovakia

6EEP4 **Quench Detection in REBCO Conductor by Using the Wire Itself as a Microwave Transmission Line** 2:00 – 2:20  
Goran Majkic, University of Houston, United States

6EEP5 **Continuous Measurement on Critical Current of Coated Conductors Based on a Pulsed Current Inductive Method** 2:20 – 2:40  
Xiao-Fen Li, Shanghai Jiao Tong University, China

6EEP6 **Critical Currents in Pulsed Fields from Non-Linear Electrical Transport** 2:40 – 3:00  
Boris Maierov, NHMFL, Los Alamos National Laboratory, United States

3:00 – 3:15 p.m. **Coffee | Tea Break**

3:15 – 4:15 p.m. **SESSION: Electromagnetic & Electromechanical Properties** – Continued

6EEP7 **Novel Angular and Lengthwise Critical Current Assessment in REBCO CC** 3:15 – 3:30  
Jan Jaroszynski, National High Magnetic Field Laboratory, United States

6EEP8 **Comparison of Electromagnetic, Geometrical, and Microstructural Characteristics of REBCO CC from Prominent Manufacturers** 3:30 – 3:45  
Griffin Bradford, National High Magnetic Field Laboratory, United States

**Discussion** – All Speakers 3:45 – 4:15

4:15 – 4:30 p.m. **Workshop Summary and 2025 CCA Announcement**

4:30 p.m. **Adjourn**

## POSTER SESSION

WEDNESDAY, April 5, 2023 | 5:55 pm – 7:15 pm – Hilton Lobby

## Presenters

- 5PO1 **Measurement of Transverse REBCO Delamination Strength of Conductors from Multiple Sources**  
Takanobu Mato, National High Magnetic Field Laboratory, United States
- 5PO2 **2D Reel-to-Reel Scanning Raman Spectroscopy of REBCO Conductor for Quality Control, Process Control Feedback and Prediction of In-Field  $J_c(B,T)$  Performance**  
Nathaly Castaneda Quintero, University of Houston, United States
- 5PO3 **A Fast, Novel, and Coupled Electro-Magnetic and Electro-Thermal Model for Metal-Insulated High Field Magnets**  
Anang Dadhich, Slovak Academy of Sciences, Slovakia
- 5PO4 **Optimization of ReBCO CORC®-based Cable-In-Conduit-Conductors for Fusion**  
Arend Nijhuis, University of Twente, The Netherlands
- 5PO5 **Superior Critical Current of Long Length 4  $\mu$ m Thick REBCO Tapes**  
Chirag Goel, University of Houston, United States
- 5PO6 **REBCO Films on Flexible Dielectric Substrates for Microwave Applications**  
Jithin sai Sandra, University of Houston United States
- 5PO7 **Electromechanical and Electromagnetic Testing of Advanced MOCVD REBCO Tapes**  
Vamsi Yerraguravagari, University of Houston, United States
- 5PO8 **Electromagnetic Properties of 2  $\mu$ m Thick 15% Zr-doped  $\text{REBa}_2\text{Cu}_3\text{O}_{7-8}$  Double-Sided Tapes**  
Bhabesh Sarangi, University of Houston, United States
- 5PO9 **Quality Assessment of Long REBCO Coated Conductors by Offline/Inline Characterization Techniques Augmented by Machine-Learning Models**  
Siwei Chen, University of Houston, United States
- 5PO10 **Correlation of Microstructural and Transport Characteristics of REBCO Conductors with Variable  $J_c$  (4.2K) and Variable Superconducting Layer Thickness**  
Yavuz Oz, National High Magnetic Field Laboratory, United States
- 5PO11 **Design of a 40-MW-Class Electric-Wire-Interconnect-System for Liquid-H<sub>2</sub> Fuel-Cell Propulsion**  
Timothy Haugan, U. S. Air Force Research Laboratory, United States
- 5PO12 **Screening Current Induced Strain in Ultra-High-Field REBCO-Coated-Conductor Magnets**  
Yi Li, Princeton Plasma Physics Laboratory, United States
- 5PO13 **Design and Analysis of an Axial Flux High-Temperature Superconducting Motor**  
Jun-Yeop Lee, Changwon National University, South Korea
- 5PO14 **FEM Modeling of Heating Effects During Current Sharing in REBCO Cables Containing Faulty Strands**  
Milan Majoros, The Ohio State University, United States
- 5PO15 **Glassy and Plastic Vortex Creep Regimes in Superconducting  $(\text{Y,Gd})\text{Ba}_2\text{Cu}_3\text{O}_y$  Films and Coated Conductors**  
Leonardo Civale, Los Alamos National Laboratory, United States
- 5PO16 **Experimental Design and Simulaton for Testing Current Redistribution in a REBCO Tape-Stack Cable**  
John Rogers, Texas A&M University and Accelerator Technology Corporation, United States
- 5PO17 **Conceptual Design of a ReBCO Non-insulated Ultra-high Field Solenoid for the Muon Collider**  
Bernardo Bordini, CERN, Switzerland

## NOTES

[illegible]

# CCA2023



International Workshop on Coated Conductors for Applications



## APRIL 3 - 6, 2023 EVENTS

-  **① Hotel Registration (4/3-4)**  
**Breakfasts (4/4-6)**  
**Lunches (4/5-6)**  
**Location of Sessions (4/4-6)**  
Hilton University of Houston, Shamrock Ballroom  
4450 University Drive, Houston, TX 77204
-  **② Lunch & Group Photo (4/4)**  
MD Anderson Library, Elizabeth D. Rockwell Pavilion  
2<sup>nd</sup> Floor – 4333 University Drive, Houston, TX 77204  
(Meet guides in Hilton Lobby for walk-over)

## Parking Garages

-  **Hilton Hotel Underground Parking**  
Entrance 4
-  **UH Welcome Center Garage**  
4833 Martin Luther King Blvd, Houston, TX 77004

**Campus Maps:** [www.uh.edu/maps/](http://www.uh.edu/maps/)

**More Parking Information & Rates:**  
[www.uh.edu/parking/parking-on-campus/visitor](http://www.uh.edu/parking/parking-on-campus/visitor)

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