

Scientific and Technical Directorate(STD)

Jay Hendricks, Scientific Director Katsuyuki Fukutani, Scientific Secretary

ECM-135
Hybrid/Virtual Meeting
November 19th, 2021



Scientific Director's Forward View

The Scientific and Technical Directorate (STD) coordinates the Scientific and Technical activities of the Nine IUVSTA Divisions

- Communication: "Serve as an international communication 'hub' that connects vacuum science and technology scientists around the world".
- Education: Work with Division Chairs to develop Workshops, Schools, Short Courses, and Technical Training
- IVC Scientific: Work with IUVSTA Division Chairs to Develop IVC-22 Program and abstract calls through the international program committee.
- Society Impact: Find Applications where our science has positive impact for society.
 - Support for science in less developed countries .
- Develop Focus Topics:
 - <u>Technologies for Sustainability</u> (clean water, air,
 - Quantum Science (AVS Quantum Science journal, Quantum Based Units, Quantum Computing/deep learning).
 - <u>Photonics and Nano photonics</u> (multiple technologies, including bio applications)
 - Role of Sensors and Sensor Science (AI, Self-driving cars)
 - Next Gen. Energy (Fusion, Solar, new materials and process enabling technologies, batteries)
 - FIGURE OUT HOW TO FUNCTION IN A PANDEMIC!!!



2019-2022 IUVSTA Scientific and Technical Division Officers

IUVSTA Division	<u>Chair</u>	Vice Chair_	Secretary
ASSD - Applied Surface Science	Leszek Markowski	John T. Grant	
BID - Biointerfaces Division	Dmitri Petrovykh	Miguel Manso	Carlos R. Grandini
EMPD - Electronics Materials & Proc.	Ivana Capan	Monika Kwoka	Reinhard Schwarz
NSD - Nanometer Structures	Ana Gomes Silva	Shuji Hasegawa	Carla Bittencourt
PSTD - Plasma Science & Tech.	Satoshi Hamaguchi	Miran Mozetič	Deborah O'Connell
SED - Surface Engineering	Ivan G. Petrov	Peter Schaaf	Monika Jenko
SSD - Surface Science	María Carmen ASENSIO	Mario Rocca	Fumio Komori
TFD - Thin Film	Mile Ivanda	Papken Hovsepian	Diederik Depla
VSTD - Vac. Science & Tech.	Marcelo J. Ferreira	Martin Wüest	Joe Herbert
EC- Education Committee	Alberto Tagliaferro	Ana Silva	Sylve Bourgeois



The changing landscape of scientific meetings

- In-Person Meetings
 - > PRO: Fantastic opportunity, "real-world experience-based" learning
 - CON: Expensive
- Virtual Meetings
 - > PRO: Unlimited reach, low-cost
 - Lack the "real-world" learning experience and networking
- Hybrid Events
 - > PRO: Best of both worlds
 - > CON: Twice the work for organizer



AGENDA STD ECM-135

- 1. Opening and Welcome (10 min)
 - Scientific Director's Report (Jay Hendricks)
 - Attendance (Katsuyuki Fukutani)
 - Adoption of Agenda (all)
 - Approval Minutes of previous ECM134 (link below)

https://iuvsta.org/iuvsta2/assets/docs/meantime/ECM 135/STD minutes ECM134 20210322.pdf

- 2. Divisional reports (30 min)
- ASSD-Applied Surface Science Division
- BI-Biointerfaces Division
- EMPD-Electronic Materials & Processes Division
- NSD-Nanometer Structures Division
- PSTD-Plasma Science & Techniques Division
- SED-Surface Engineering Division
- SSD-Surface Science Division
- TFD-Thin Film Division
- VSTD-Vacuum Science and Technology Division

..... Leszek Markowski

...... Dmitri Petrovykh

...... Ivana Capan

...... Ana Gomes Silva

...... Satoshi Hamaguchi

...... Ivan G. Petrov

...... María Carmen ASENSIO

...... Mile Ivanda

Marcelo I. Ferreira



2. Division Reports (30 min)

Division	/ Reports	Chair	Presenting	Vice Chair	Secretary
ASSD	(2-3 min)	Leszek Markowski	<mark>Leszek</mark>	John T. Grant	
ВІ	(2-3 min)	Dmitri Petrovykh	<mark>Dmitri</mark>	Miguel Manso	Carlos R. Grandini
EMPD	(2-3 min)	Ivana Capan	<mark>Ivana</mark>	Monika Kwoka	Reinhard Schwarz
NSD	(2-3 min)	Ana Gomes Silva	Ana	Shuji Hasegawa	Carla Bittencourt
PSTD	(2-3 min)	Satoshi Hamaguchi	<mark>Miran</mark>	Miran Mozetič	Deborah O'Connell
SED	(2-3 min)	Ivan G. Petrov	<mark>Ivan</mark>	Peter Schaaf	Monika Jenko
SSD	(2-3 min)	María Carmen ASENSIO	<mark>Fumio</mark>	Mario Rocca	Fumio Komori
TFD	(2-3 min)	Mile Ivanda	Mile not present	Papken Hovsepian	Diederik Depla
VSTD	(2-3 min)	Marcelo J. Ferreira	Marcelo	Martin Wüest	Joe Herbert
Education	on	Alberto Tagliaferro	Alberto @ 16:30 in the EC	Ana Silva	Sylvie Bourgeois

INSERT DIVISION REPORT HERE OR HAVE Katsuyuki project (local file)



3. Presentation on Past WS/SCH/TTC/SC (5 min each, 15 min total)

Proposal filename	Place/ Country	Date	Organizer (underwriter)	IUVSTA Committee	Presenter	Title	Requested Funding (€)
24th IUVSTA TTC	Virtual (Quezon City, Philippines)	April 15-16, 2021	Vacuum Society of the Philippines (VSP)	EC	Kathrina Lois Taaca	"Plasma and Society"	1545 (ECM 133)
18 th IUVSTA School	"Hybrid" Czech	May 31 – 4, 2021	Czech Physical Society	STD	<mark>Antonín Fejfa</mark> r	"Physics at Nanoscale"	4000 (ECM 134)
IUVSTA SC "Gas Flows"	"Hybrid" Marseille France	November 22- 25, 2021 included in EVC 16	French Vacuum Society(SFV)	EC	Sylvie Bourgeois/ Anouk	"Gas flows under vacuum conditions: from theory to applications"	2000 (ECM 133)



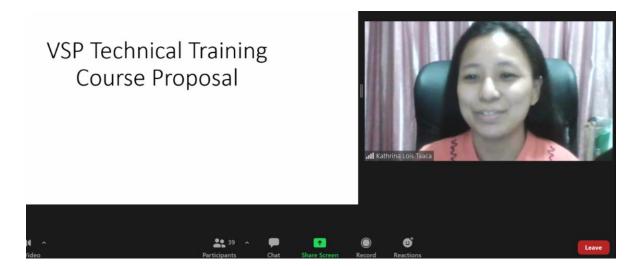
ECM 133: 24th IUVSTA Virtual Technical

Training Course
(2) TTC_1 Voted: 8 votes yes, 0 vote no, and 4 votes abstention

According to the results voted in the STD, the STD proposes a virtual Technical Training Course with title "Plasma and Society" to the ECM 133 for final approval as the 24th IUVSTA Technical training course with IUVSTA financial support of up to 1930 EUR as long as the scientific director is satisfied with the requested modifications.

Dear Madam President

the STD proposes a virtual Technical Training Course with title "Plasma and Society" to the ECM 133 for final approval as the 24th IUVSTA Technical Training Course with IUVSTA financial support of up to 1930 EUR as long as the scientific director is satisfied with the requested modifications.









INTRODUCTION TO PLASMA IN THE PHILIPPINES

Plasma Technology In the Philippines The Establishment of the Plasma-Material Interactions Laboratory History and Research of the Vacuum Coating Laboratory



INDUSTRIAL APPLICATIONS OF PLASMA (PART 1)

PECVD for Material Fabrication COATIN: When Laboratory Meets Industry



INDUSTRIAL APPLICATIONS OF PLASMA (PART 2)

Roll-to-Roll Sputter Process Industrial Applications of Plasma Science



ROLES OF PLASMA IN BIOMEDICAL APPLICATIONS

Surface Modification of Biomaterials Plasma Science and Technology in Baguio Plasma-Activated Solutions for Cancer Therapy

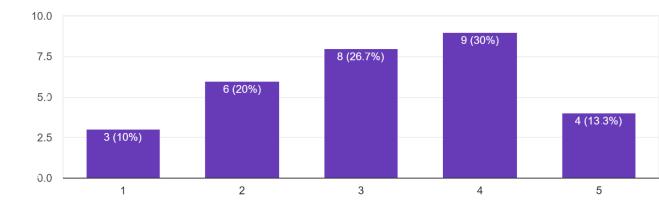


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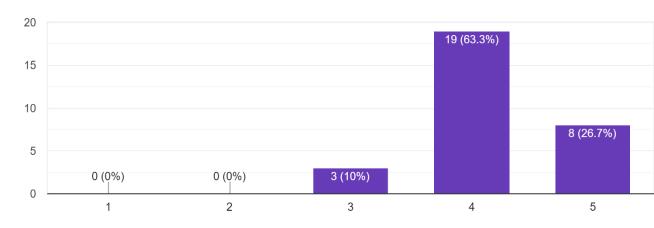
to register



Before attending the Technical Training Course, how well do you know about plasma technology? 30 responses



After attending the Technical Training Course, how well do you know about plasma technology? 30 responses



ISVSP 2022

REFOCUSING VACUUM AND PLASMA TECHNOLOGY TO THE CURRENT NEEDS OF THE SOCIETY

SAVE THE DATE

FEBRUARY 3-5, 2022

3. Presentation on Past WS/SCH/TTC/SC (5 min each, 15 min total)

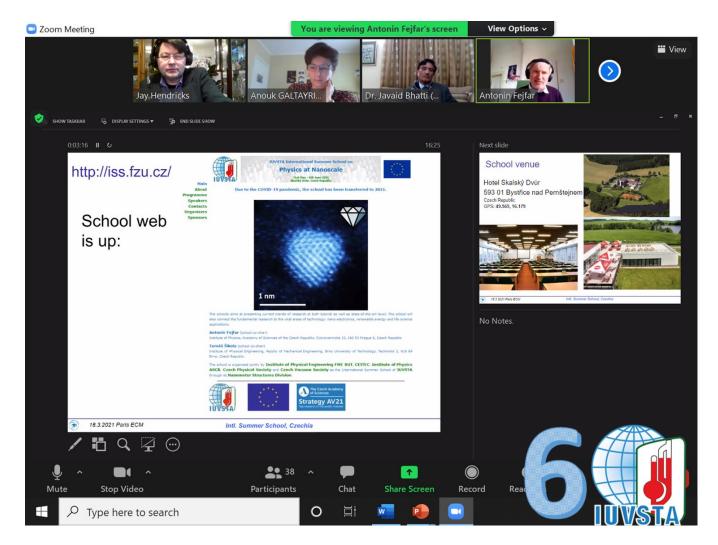
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IUVSTA SC "Gas Flows"	"Hybrid" Marseille France	November 22- 25, 2021 included in EVC 16	French Vacuum Society(SFV)	EC	Sylvie Bourgeois/ Anouk	"Gas flows under vacuum conditions: from theory to applications"	2000 (ECM 133)



18th UVSTA Virtual School on Physics at Nanoscale ECM134

(1) Sc_1 Voted: 9 votes yes, 0 vote no, and 0 vote abstention

According to the results voted in the STD, the STD proposes an either hybrid or virtual School with title "Physics at Nanoscale" to the ECM 134 for final approval as the IUVSTA School with IUVSTA financial support of 4000 EUR.



18th International Summer School on Physics at Nanoscale, Czech Republic



18th IUVSTA International Summer School on

Physics at Nanoscale

8th - 10th June 202 Czech Republic



Main About Programme Speakers Student hubs

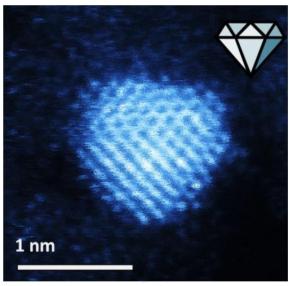
Contacts

Organizers

Sponsors

The school will take place online.

For registration, please go to student hubs













Organizers

Institute of Physics AS CR
Brno University of Technology
CEITEC
Charles University
Masaryk University
Czech Technical University
J. E. Purkinje University
Czech Physical Society
Czech Vacuum Society

Sponsors
IUVSTA
Edwards
HVM Plasma
MT-M.eu
NenoVision
Optik Instruments
Pfeiffer Vacuum Austria
Specion
Tescan Orsay Holding
Thermo Fisher Scientific (FEI)
Uni-Export Instruments
Vakuum Praha

About the school

Part of the series of schools held every 3 years as IUVSTA school Intended for Ph.D. students and young researchers because of COVID it has taken place in hybrid mode:

with student hubs in

Prague (Institute of Physics, Czech Academy of Sciences)

Brno (Brno University of Technology)

Brno (Ceitec Nano)

Vienna (TU Wien)

Zurich (ETH)

Lausanne (EPFL)

Grenoble (ILL)

Plus participants online from the Netherlands, Iran,

Poster session: organized using gather.town.

over 100 people (students & speakers).





nme at a glance

iver Benson
iantum photonic hybrid systems
nooptik AG, Humboldt-Universität zu
rlin, Germany



Burkard Hillebrands Spin dynamics/spin waves

Department of Physics and Research Center OPTIMAS, TU Kaiserslautern, Germany

Pietro Gambardella

spintronics

Switzerland

Department of

Magnetic interfaces and

Materials, ETH Zürich,

Timetable of the Toth IO	VSIA Sullii	nei school			100000000	
	Physics at Nanoscale					
Monday 7.6.		Tuesday 8.6.		Wednesday 9.6.	Thursday 10.6.	
			9:00-10:30	Benson: Q nanophotonics	9:00-10:30	Hillebrands: Spin waves
				1		Gambardella: Surfaces
			40.00.40.00			lunch
			10:30-13:00	posters	joint excursion:	
						Physics at Large
	15:30	kickoff				
	16:00-17:30	Heuken: MOCVD	16:00-17:30	Krenn: Nanooptics/Plasmonics		
Michael Heuken	17:30-19:00	Rijnders: Smart materials	17:30-19:00	Lips: Spin probes		
Wilchael Heukell						
MOCVD structures for		student mixer		Panel discussion		School wrap up
optoelectronics		Physics At Dance		Physics at Home		

<u>RWTH Aachen University &</u> Aixtron GmbH, Germany



Joachim Krenn
Nano-optics/Plasmonics

Karl Franzens University Graz, Austria



Guus Rijnders
Smart materials for electronic and microelectronic systems

<u>University of Twente, The Netherlands</u>

Timetable of the 16th ILIVSTA summer school

Klaus Lips
Spins as probes

EMIL, Helmholtz Zentrum Berlin, Germany

Student hubs





























FZU Prague

Institute of Physics, Czech Academy of Sciences

Cukrovarnicka 10, Prague 6, Czech Republic

Prague hub is organized by Matěj Hývl et al.

FPFI

Swiss Federal Institute of Technology Lausanne (EPFL)

EPFL, CH-1015 Lausanne

Lausanne hub is organized by Tereza Schönfeldová, David Roesel et al.

BUT Brno

Brno University of Technology

Institute of Physical Engineering, Brno University of Tehnology, Technická 6, Brno, Czech Republic Brno BUT hub is organized by Petr Liška et al.

CEITEC Brno

Central European Institute of Technology, Brno University of Technology

CEITEC Brno University of Technology, Purkyňova 656/123 612 00 Brno, Czech Republic

CEITEC hub is organized by Katarina Rovenská et al.

TU Vienna

Institute of Applied Physics at the Vienna University of Technology

Institut für Angewandte Physik , Technische Universität Wien, Wiedner Hauptstr. 8-10/134, 1040 Wien. Austria

Vienna hub is organized by Jan Balajka et al.

ETH Zürich

Dpt. of Materials, ETH Zürich

Hönggerbergring 64, 8093 Zürich, Switzerland

Zürich hub is organized by Štěpán Kovařík & Viola Křižáková et al.

Registration for this hub has been closed.

Grenoble

Institut Néel, Grenoble, France

Institut Néel CNRS/UGA UPR2940, Grenoble, France

Grenoble hub is organized by Laurent Ranno, Ivan Mohelský et al.

Registration for this hub has been closed.

Global hub (online)

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ECM 133: Satellite Short Course to EVC16 IUVSTA Short Course "Gas flows under vacuum conditions: from theory to applications"

(3) SC_1 Voted: 11 votes yes, 0 vote no, and 1 vote abstention According to the results voted in the STD, the STD proposes a **Short Course** with title "**Gas flows under vacuum conditions: from theory to applications**", to be held in Marseille, France to the ECM 133 for final approval as an IUVSTA **Short Course** with IUVSTA financial support of **2000** EUR.

Dear Madam President

the STD propose a **Short Course** with title "**Gas flows under vacuum conditions: from theory to applications**", to be held in Marseille, France to the ECM 133 for final approval as an IUVSTA **Short course** with IUVSTA financial support of **2000** EUR.

IUVSTA SHORT COURSE on Gas flows under vacuum conditions: from theory to applications

Marseille (France), 22-23 November 2021 In link with EVC16

Hybrid form

11 participants

2 virtual: China and Thailand

9 present in Marseille

1 Czech Republic

3 France

1 UK

2 Germany,

1 Poland

1 Switzerland





Vacuum Science and Technology Division (VSTD)

Lecturers

Prof. Felix Sharipov (Brazil) virtual Dr. Oleg B. Malyshev (UK) Prof. Irina Graur (France)

Dr. Roberto Kersevan (Switzerland)

present present present

4. Status of existing WS as of 11-19-2021

							_
title	Place/ Country	Status/Date	Organizer (underwriter)	IUVSTA Division	Primary Contact	Title	Requested Funding (€)
WS 90	Spain	Now planned for first semester of 2022. hybrid event		SSD	Juan.F.Sanchez@u v.es	"Tuning properties of advanced energy materials using modern theoretical and experimental methods"	6000
WS 91		Will have 2 parts: 1.Local in-person Feb. 27-28, 2022 2. Virtual March 1-3, 2022		NSD	baran.eren@weizm ann.ac.il	"Surface Chemistry of Catalytic Systems"	6000
WS 92	Okinawa Japan	Satellite of IVC22 Sept. 19-22, 2022	Japan Society of Vacuum and Surface Science	NSD, SSD	shuji@surface.phy s.s.u-tokyo.ac.jp	"Workshop on Advanced Spectroscopy and Transport for 2D Materials at Surfaces"	
WS 93	Castle Seggau, Austria	"Fall" 2022	Austrian Vac. Soc.	SE NSD, TFD, ASSD	petrov@illinois.e du	"Advances in the characterization of surface engineering structures, coatings, and thin films"	6000
WS 94	Cerklje na Gorenjskem Slovenia	"Summer 2022"	Slovenian Vacuum Society	PSTD	Miran Mozetič	"Reliable sensing and control of reactive plasmas"	9000
WS 95	Guimarães Portugal	June 20-23, 2022	University of Minho	TFD	Joel Borges	"Plasmonic Thin Films: Theory, Synthesis and Applications"	6000 21

4. Status of existing Proposals TTC/SC as of 11-19-2021

Title	Place/ Country	Status/Date	Organizer (underwriter)	IUVSTA Committee	Primary Contact	Title	Requested Funding (€)
TTC 21	Štrbské Pleso, Hotel Trigan	"Spring 2022" May combine with JVC if in SK	Slovak Vacuum Society	(EC)	Andy Vincze	"Vacuum technology, principles and applications"	2500
TTC 22	Islamabad Hotel, Islamabad, Pakistan	In-Person Dec. 7-9, 2021. Islamabad Hotel Website www.pvs.com.pk	Pakistan Vacuum Society	(EC)	Javaid Ahsan Bhatti	"IUVSTA TTC on Vacuum Technology Applications"	2500
TTC 23	Universidad Nacional de San Martin, Argentina	Cancelled	Asociación Física Argentina	(EC)	Miguel Sanchez	"Intro to Vac Sci, Tech, and Application: from Nano sci to outer space"	2500
SC Low Energy Microscopy	Córdoba, Spain	In person Sep. 26, 2022 https://leempeem1 2.secv.es/	Vacuum Society- Spain	(EC)	miguel.manso @uam.es	"Low Energy and PhotoEmission Electron Microscopy"	1000

- 5. Use of MailChimp for communications (Dmitri Petrovykh, 5 min) http://eepurl.com/hwcAUb
- 6. Other business ...such as planning next EVC, EVC17 in 2024! Also, Next ICTF by TFD in 2023?
- 7. Adjourn

Thanks!

Jay Hendricks, Scientific Director, November 19th, 2021



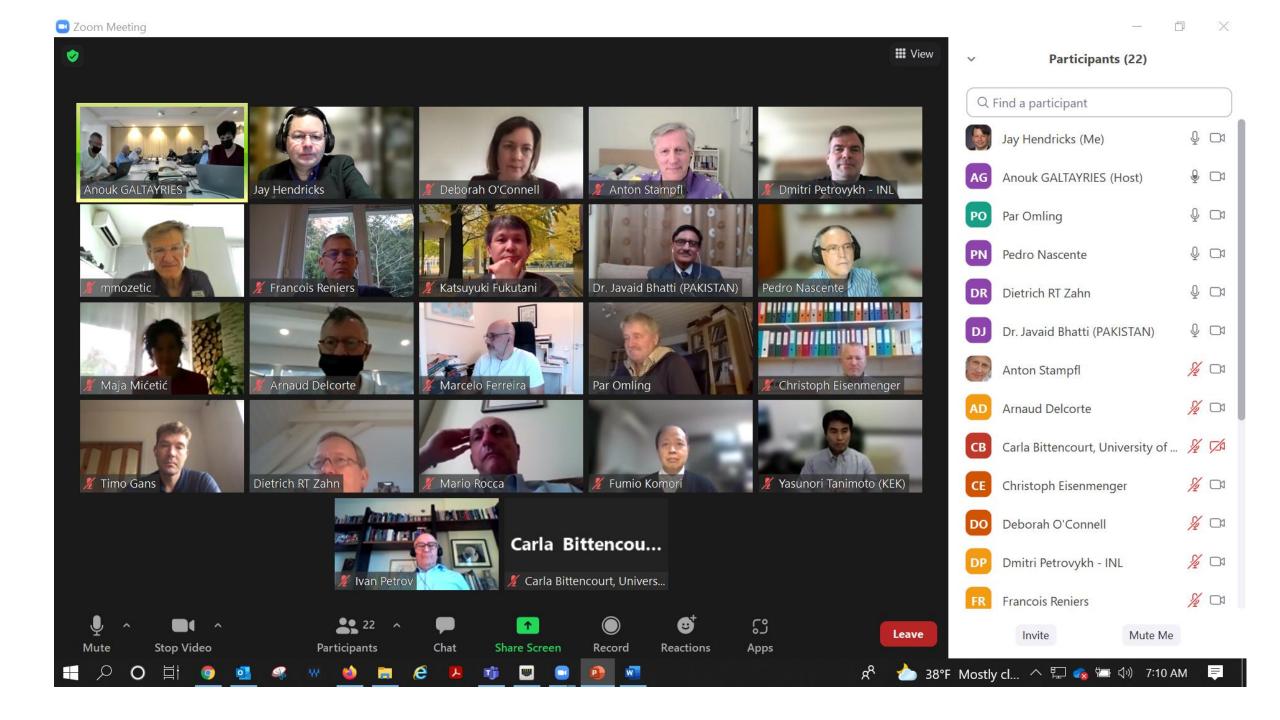
IUVSTA

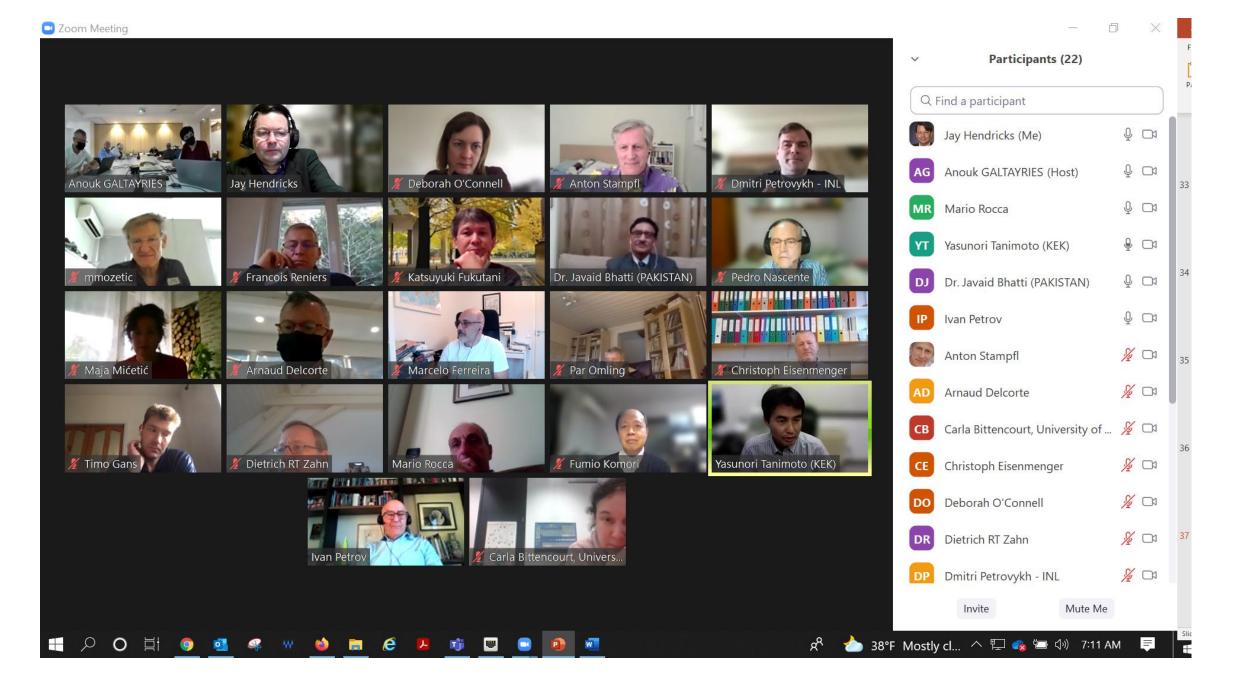
National Institute of Standards and Technology 100 Bureau Drive Gaithersburg, MD 20899



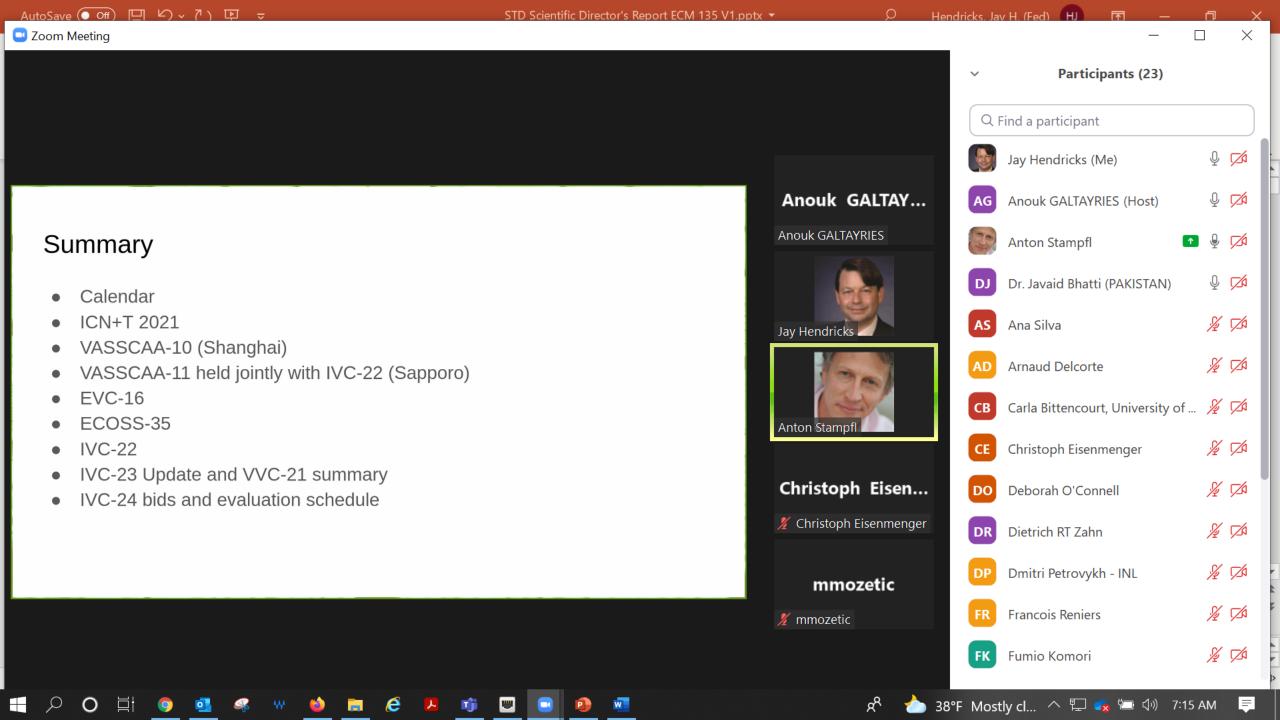
	WS Workshops	SCH Schools	TCC Technical Training Course	SC Short Course
			, and the second	(may adapted to webinar)
Submission:	TO: Scientific Secretary CC: SD + organizers	TO: Scientific Secretary CC: SD + organizers	TO: Scientific Secretary CC: ECC/ECVC/ECS/SD + organizers	TO: Scientific Secretary CC: ECC/ECVC/ECS/SD + organizers
Summary/ Purpose:	To <i>advance</i> scientific knowledge in a field; rather than be educational of existing knowledge	To <i>educate</i> on existing knowledge		To educate on existing knowledge "state of the art "in a specific field
Organized by/Underwrit er	Organized IUVSTA Division(s)/National Vacuum Society or university	Organized IUVSTA Division(s)/National Vacuum Society or university	Organized IUVSTA Division(s)/National Vacuum Society or university	Organized IUVSTA Division(s)/National Vacuum Society or university
Format:	Format should be like that of a "Gordon Conference" with no publication of proceedings.	Format is a <i>school</i> with Intense instruction on a specific topic with learning/educational materials provided.	·	Held in conjunction with existing scientific meeting. Example AVS Short Courses
Location:	Remote location (not large city) in a hotel, hostel, university campus, or small town.	Typically, University campus	Regional	Regional to Main scientific meeting
Size/Duration	40-50 delegates 4-6 days	40-80 students 1 to 2 weeks		any 1-2 days
Participation:	Organizers invite 10-20 talks of <i>International</i> experts	<i>International</i> teaching experts in the field	Regional experts and students	Regional experts and students
Program:	Dominated by single session oral presentations by invited speakers. Lots of unstructured discussion space in program and time for questions (opposite of a conference style with little time for questions).	Intense instruction/school on a specific topic with learning/ educational materials provided often in the form of textbook		1-2 days held in conjunction with a main scientific meeting.
Funding:	6,000-9,000 Euro	6,000-9,000 Euro	2,500 Euro maximum	2,000 Euro maximum
Language:	Typically, English (French/German permitted)	Typically, English (French/German permitted)	Local/regional language is encouraged	English (French/German permitted), maybe regional if main conference is regional language (unusual).
Approval Route	STD→ECM	STD→ECM	EC→STD→ECM	EC→STD→ECM

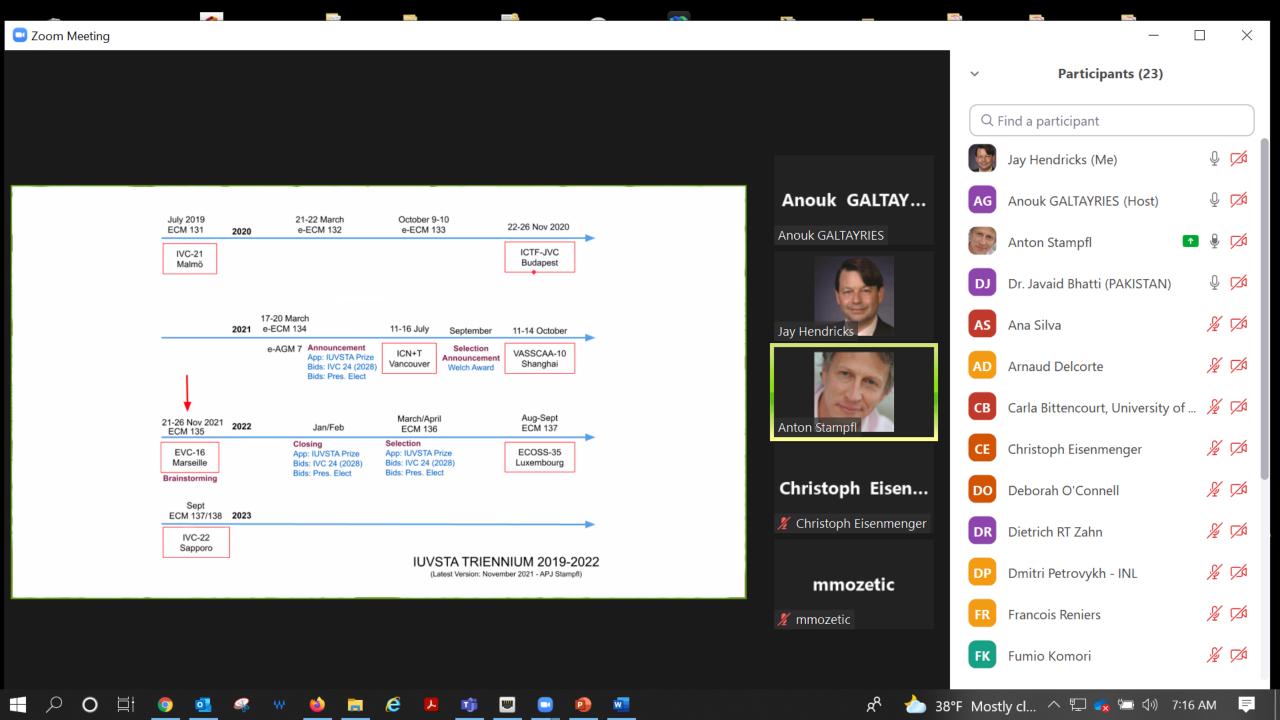
Screenshots From ECM135 Day 1: NOV 19th, 2021









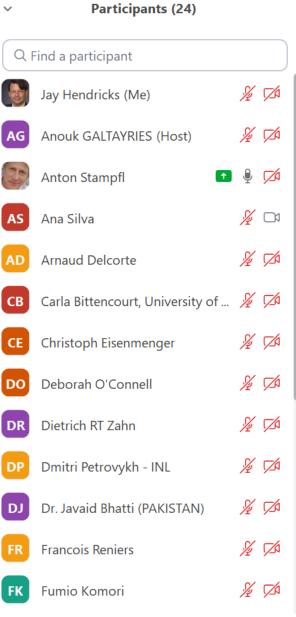




VASSCAA-ISC Discussions 15 November 2021

- VASSCAA-11 to be held in Sapporo jointly with IVC-22 (2022)
- VASSCAA-12 (2024): Bids open, close in next 4 weeks
- Next ISC Meeting and dinner to be held in Sapporo



































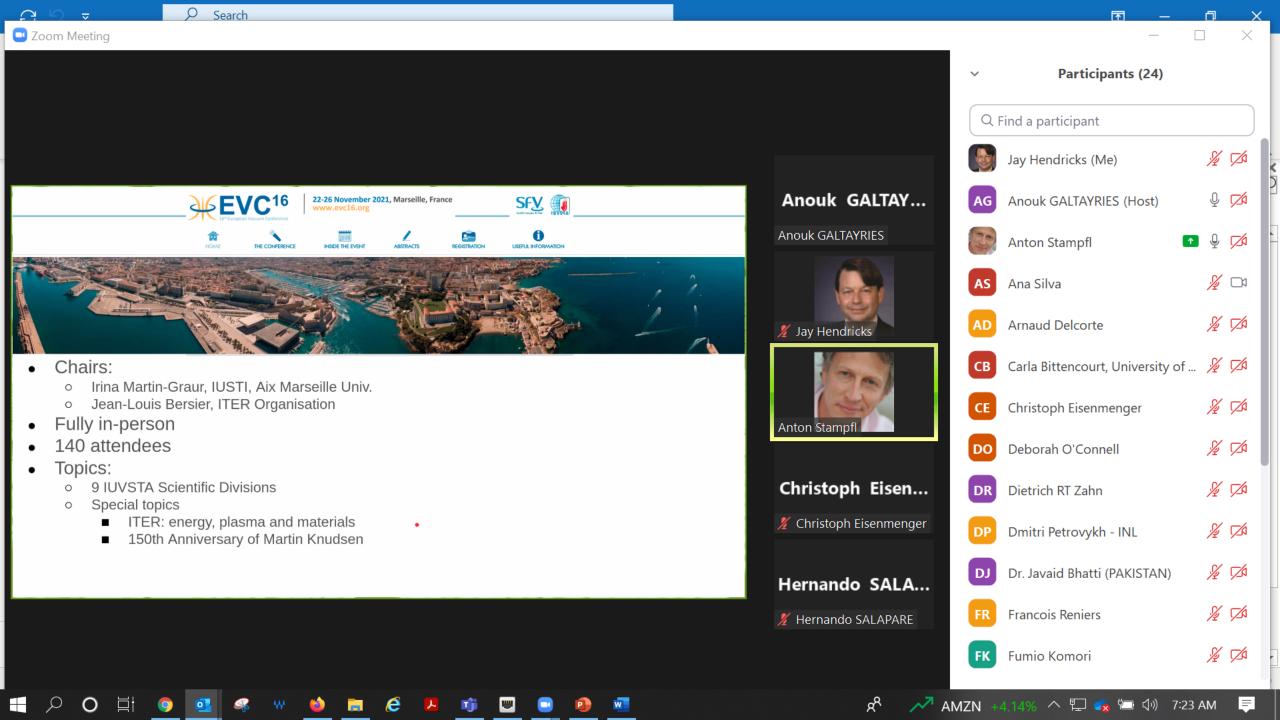


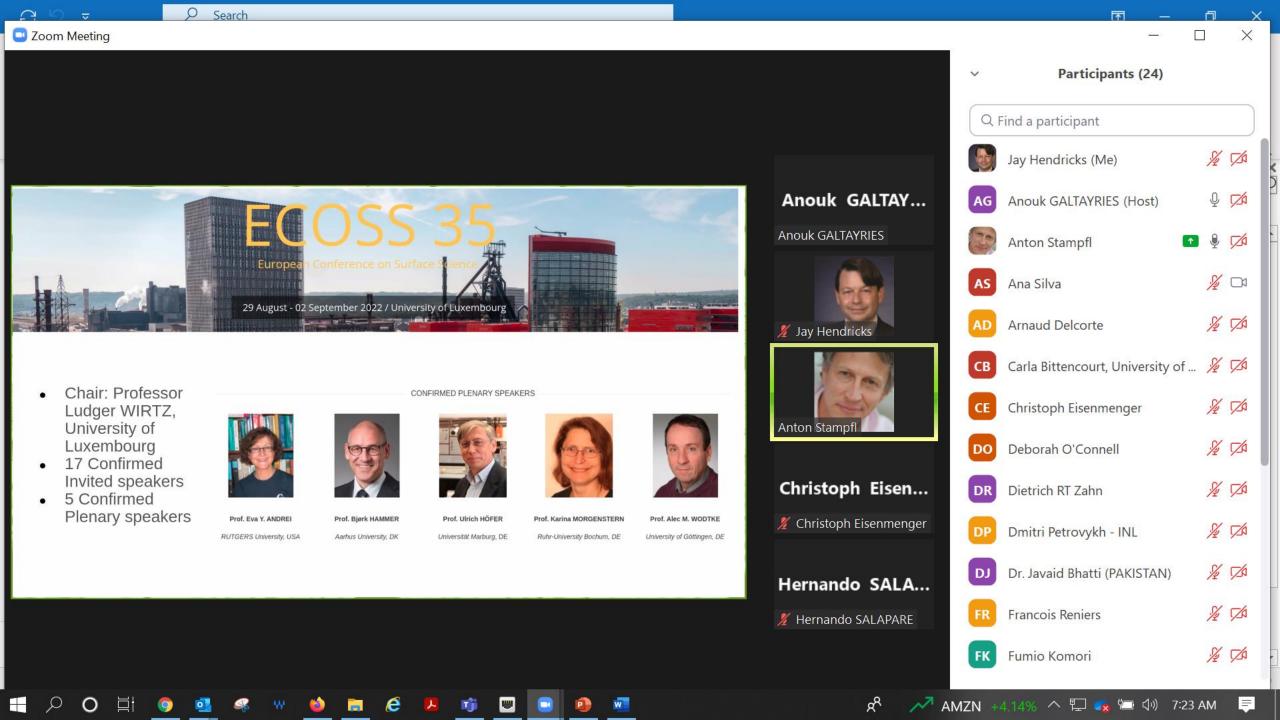
















Anouk GALTAY...

Anouk GALTAYRIES

Jay Hendricks

Anton Stampfl

Christoph Eisen...

Christoph Eisenmenger

Hernando SALA...

Hernando SALAPARE

Participants (25)

Q Find a participant

Jay Hendricks (Me)

Anouk GALTAYRIES (Host)

Anton Stampfl

Cathy Exarhos

Ana Silva

Arnaud Delcorte

Carla Bittencourt, University of ... 🔏 🔀

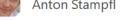
Christoph Eisenmenger

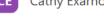
Deborah O'Connell

Dietrich RT Zahn















Dmitri Petrovykh - INL

Dr. Javaid Bhatti (PAKISTAN)

Francois Reniers

The 23rd International Vacuum Congress

Zoom Meeting

IVC-23

The 23rd International Vacuum Congress September 15-19, 2025, Sydney, AUSTRALIA



Supporters







- Working with PCO to prepare final budget
- Working with ICC to hold alternative rooms
- Working on:
 - 1200, 1500, 1800 in-persono attendees
 - 50+ exhibitors
- Doubly vaccinated ~71% TOTAL POPL.
- Single vaccinated ~78%
- NSW ~77% double, 79% single
 - Eligible (12+): 91% double, 94% single
- Booster shots starting
- International borders opening
- Travel to Portugal, Spain, Italy, Germany, UK, Canada, USA, Argentina, Chile, Singapore, Thailand
- By Christmas: Fiji, Indonesia, South Korea
- Early next year: Japan, India





















































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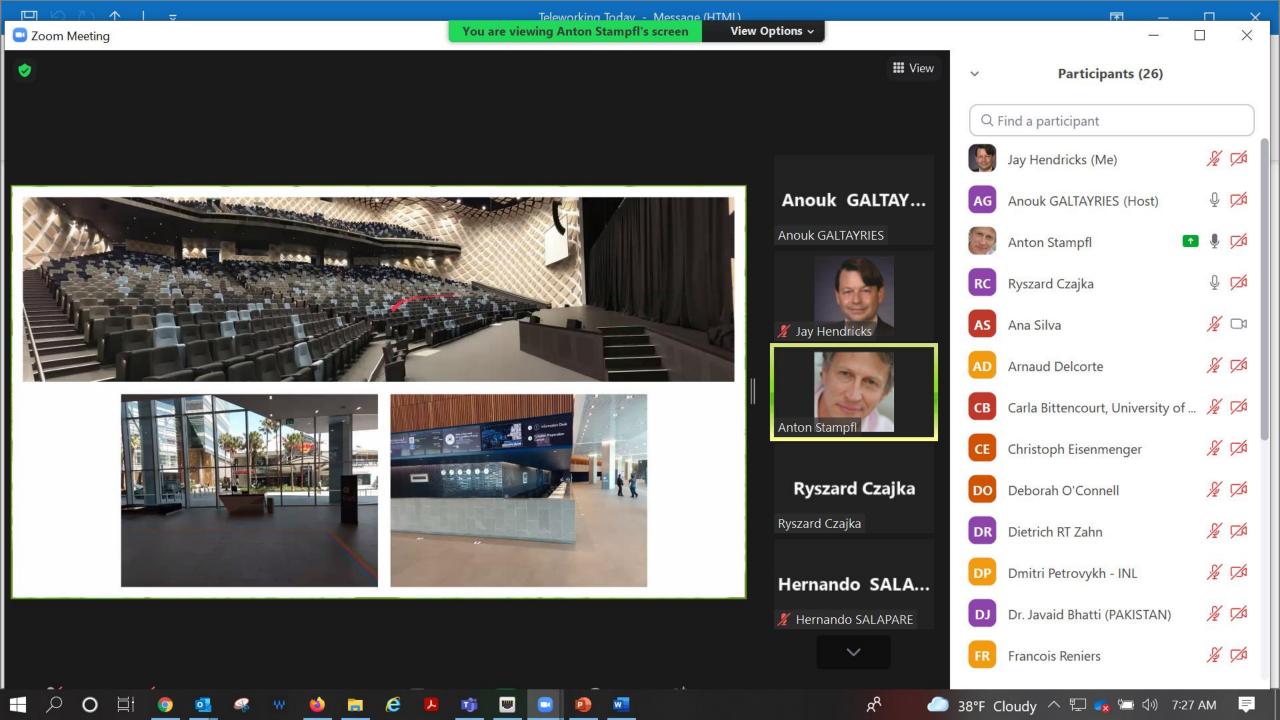
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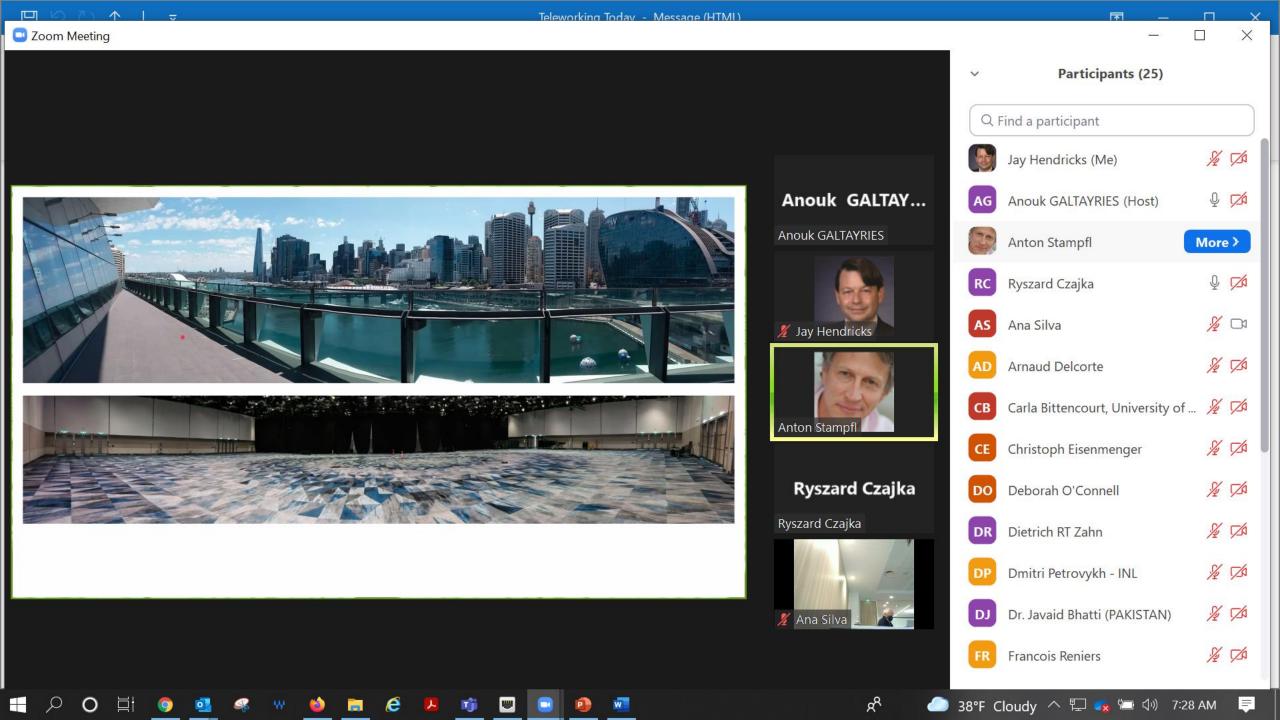
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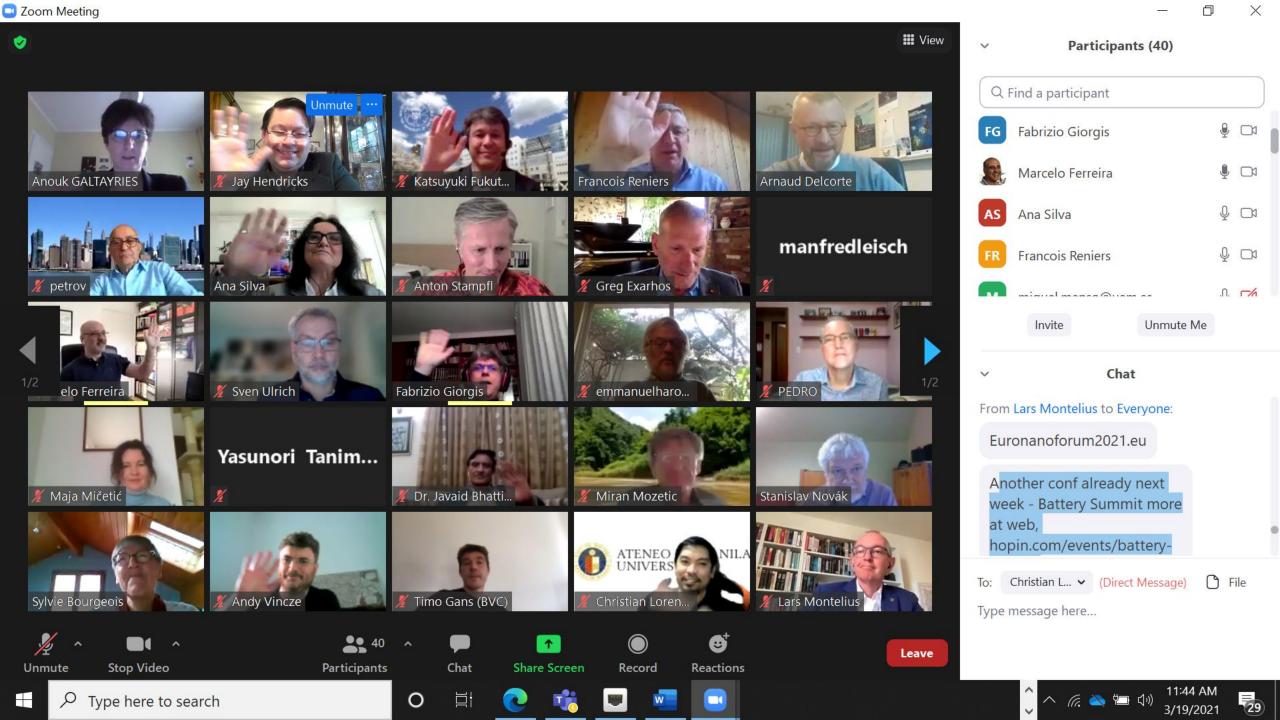
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Screenshots Below of ECM134 meeting March 18th – 19th 2021



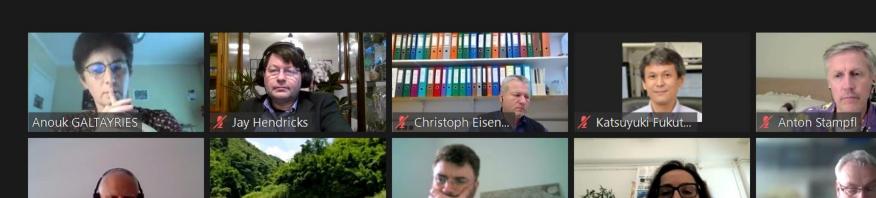


Martin Wüest

Sylvie Bourgeois

Francois Reniers

Greg Exarhos





🔏 asensio



emmanuelharo...



ivanda

🔏 Ana Silva

43664



Marcelo Ferreira

Dr. Javaid Bhatti...



Participants (35)

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№ □

¾ □

¾ □

% TA

% TA

Q Find a participant

Imarkowski

Maja Mićetić

Marcelo Ferreira

Mario Rocca

miguel.manso@uam.es

Miran Mozetic

PEDRO

Stanislav Novak

Sven Ulrich

Sylvie Bourgeois

Timo

Yasunori Tanimoto (KEK)

Invite

Unmute Me

3/18/2021







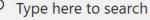




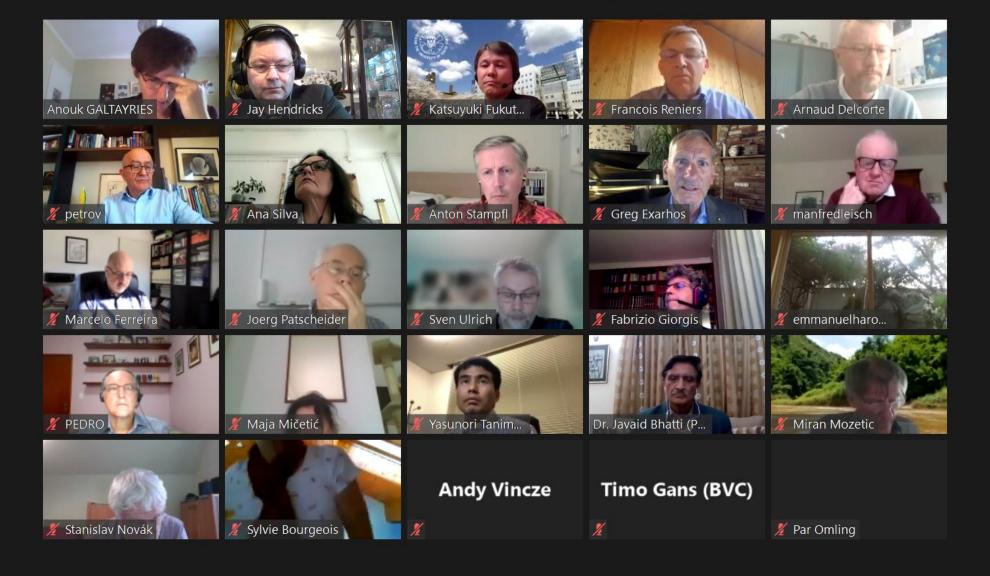








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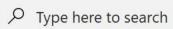




Zoom Meeting













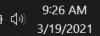




































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Contributions of Professor Peter B. Barna to the international thin film community

László Kövér

- · From early 1960's Peter along with the late Professor J.F. Pócza, J Antal, and E Hahn, organized of international thin film forums in Hungary in order to enable exchange between East and West
- The Hungarian conferences led to the establishment of the first Joint Vacuum Conferences in 1978-79, which was held as "Hungarian-Austrian Vacuum Conference" in Győr (Hungary) in 1979; Initiated by Peter along with Professors Antal, Viehböck, Wagendristel, Grasenick, and E. M. Hörl; the JVCs series has been IUVSTA endorsed.
- One of the founders of the IUVSTA Thin Film Division. 1977, Peter, as a member of the International Thin Film Committee (ITFC) working in the IUVSTA executive council, initiated the idea for the formation of the IUVSTA Thin Film Division, together with the Chairman of the ITFC Committee, Prof. Max Auwarter, his successor Prof. F. Abeles, and the President of IUVSTA, Prof. Leslie Holland.
- in 1979 the IUVSTA Thin Film Division was officially founded with Peter its secretary; established the IUVSTA ICTF series
- Organizer or main organizer of 32 IUVSTA forums conferences, schools, and workshops
- Barna is honorary chairman of the Thin Film Division of the Eötvös Loránd Physical Society since 1980
- 2010 IUVSTA Prize in Science for his outstanding results in understanding thin film growth phenomena and structureproperty relations in one and multiphase thin films.
- 2003 he received the Albert Nerken Award of AVS for seminal use of in situ electron microscopy for the characterization and understanding of microstructural evolution and texture development during thin film growth
- R. F. Bunshah Award and Honorary ICMCTF Lecture 2015 for pioneering contributions to the understanding of nanostructural evolution during thin-film nucleation and growth based upon in-situ UHV TEM video imaging.













































Perter Barner (acceptance of IUVSTA Honorary Award)



