Welcome Message

Dear Colleague,

It is a particularly special pleasure to welcome you to the 2022 meeting of the Glaucoma Research Society. As you know, this meeting was originally scheduled to take place in 2020, only to be postponed twice because of the COVID pandemic. Now finally, two years later, it is difficult to believe that it will happen! I know it has been a difficult period for us all, with travel being an important casualty of the pandemic. An in-person meeting is the most vital element of the GRS. As many organisations did during the pandemic, we could have resorted to an online meeting; however, the Executive was unanimously against this approach. For this reason, I am especially grateful that you have made the effort to travel from all over the world to be here.

The biennial meeting provides us with a rich and valuable environment to share ideas and form research partnerships. I am very grateful to the Program Committee, co-chaired by Janey Wiggs and Chris Leung, for putting together an innovative and diverse series of sessions. I am also grateful to all the speakers and moderators for accepting their tasks. We welcome candidate members from both 2020 and 2022, each of whom will present papers on their research. New this meeting are two Lightning Talk sessions which consist of shorter presentations on diverse topics. Finally, there are two excellent workshops that will take place on August 25.

We have arranged a Social Program that highlights many of the wonderful things that Halifax and Nova Scotia have to offer. Included in your registration is a visit to Pier 21, the gateway for immigration into Canada for almost half of the 20th Century. No visit to Nova Scotia is complete without a lobster dinner, so for our final gathering we will dine at Saint Mary’s Boat Club located on the beautiful Northwest Arm. After the last session on August 27, there will be a short choral concert of Early Music at the King’s College Chapel.

I hope you will enjoy the meeting. Welcome to Halifax!

Balwantray Chauhan
GRS President
## Executive Committee

**President**
Balwantray Chauhan

**President Elect**
Ki Ho Park

**Treasurer**
Keith Martin

**Secretary**
Linda Zangwill

**Past President**
Franz Grehn

**Membership Committee Chair**
David Garway-Heath

**Program Committee Co-Chairs**
Chris Leung
Janey Wiggs

**Members-at-Large**
Toru Nakazawa
Ramanjit Sihota
Hani Levkovich-Verbin

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### Speakers and Moderators

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<thead>
<tr>
<th>Name</th>
<th>Country</th>
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<tbody>
<tr>
<td>Makoto Aihara</td>
<td>Japan</td>
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<td>Wallace L.M. Alward</td>
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<td>Tin Aung</td>
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<td>Donald Budenz</td>
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<td>Claude F. Burgoyne</td>
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<td>Balwantray Chauhan</td>
<td>Canada</td>
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<td>Abbot Clark</td>
<td>USA</td>
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<td>Francesca Cordeiro</td>
<td>United Kingdom</td>
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<td>Jamie Craig</td>
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<td>John Danias</td>
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<td>Adriana Di Polo</td>
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<td>C. Ross Ethier</td>
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<td>John Fingert</td>
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<td>Brad Fortune</td>
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<td>David S. Friedman</td>
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<td>Stefano Gandolfi</td>
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<td>David Garway-Heath</td>
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<td>Gus Gazzard</td>
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<td>Christopher Girkin</td>
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<td>Aiko Iwase</td>
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<td>Christopher Leung</td>
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<td>Leonard Levin</td>
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<td>Jeffrey M. Liebmann</td>
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<td>Nick Marsh-Armstrong</td>
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<td>Marcelo Nicoleta</td>
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<td>Louis R. Pasquale</td>
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<td>Lutz Pillunat</td>
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<td>Harry Quigley</td>
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<td>Pradeep Y. Ramulu</td>
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<td>Alan Robin</td>
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<td>Ursula Schötzer-Schrehardt</td>
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<td>Joel S. Schuman</td>
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<td>Kuldev Singh</td>
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<td>George Spaeth</td>
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<td>Ingeborg Stalmans</td>
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<td>Daniel Stamer</td>
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<td>Anja Tuuonen</td>
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<td>Monica Vetter</td>
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<td>Janey L. Wiggs</td>
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<td>Tina Wong</td>
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<td>Linda Zangwill</td>
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### Schedule

<table>
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<tr>
<th>Day</th>
<th>August 24</th>
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<tr>
<td><strong>7:30 - 17:00</strong></td>
<td>Registration Desk Opening</td>
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<tr>
<td><strong>08:00 - 08:10</strong></td>
<td>Welcome</td>
<td>Session 1: Alumni Hall</td>
<td>Session 4: Alumni Hall</td>
<td>Session 6: Alumni Hall</td>
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<td><strong>08:10 - 09:50</strong></td>
<td>Session 1: Alumni Hall</td>
<td>Session 4: Alumni Hall</td>
<td>Session 5: Goldmann Lecture Alumni Hall</td>
<td>Business Meeting Alumni Hall</td>
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<tr>
<td><strong>09:50 - 10:20</strong></td>
<td>Break</td>
<td>Break</td>
<td>10:20 - 10:50</td>
<td>11:50 - 13:00</td>
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<td><strong>10:20 - 12:00</strong></td>
<td>Session 7: Alumni Hall</td>
<td>Session 8: Alumni Hall</td>
<td>Business Meeting Alumni Hall</td>
<td>Lunch Ground Floor</td>
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<td><strong>12:00 - 13:30</strong></td>
<td>Lunch Ground Floor</td>
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<td><strong>12:00 - 13:30</strong></td>
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<tr>
<td><strong>13:40 - 15:00</strong></td>
<td>Workshop I Archibald Room</td>
<td>Workshop II KTS lecture Hall</td>
<td>Optional Tour</td>
<td>Lunch Ground Floor</td>
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<td><strong>13:30 - 20:30</strong></td>
<td>13:30 - 20:30</td>
<td>Optional Tour</td>
<td>Visit to Grand Pre National Historic Site</td>
<td>Wine tasting at Benjam Bridge</td>
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<tr>
<td><strong>15:00 - 17:00</strong></td>
<td>Registration Desk Opening Alumni Hall Foyer</td>
<td>15:00 - 15:30 Break</td>
<td>15:30 - 17:10 Session 3 Alumni Hall</td>
<td>16:00 Meeting Adjourns</td>
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<td><strong>16:10 - 17:00</strong></td>
<td>Welcome Reception at Citadel Hill</td>
<td>18:30 - 22:30 Social Dinner</td>
<td>18:30 - 22:30 Social Dinner</td>
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</table>
08:00 - 08:10 | Alumni Hall
Welcome
Balwantray Chauhan

08:10 - 09:50 | Alumni Hall
Session 1 - Population screening and risk stratification
Moderators: Donald Budenz, Joel Schuman

08:10 Polygenic risk scores
Anthony Khawaja

08:30 Myopia and glaucoma screening with perimetry
Aiko Iwase

08:50 Artificial Intelligence for glaucoma detection: challenges and a quest for solutions
Ingeborg Stalmans

09:10 The ZAP trial on angle closure
David Friedman

09:30 Telemedicine in glaucoma
Louis Pasquale

09:50 Break

10:20 - 12:00 | Alumni Hall
Session 2 - Detecting glaucoma progression
Moderators: Balwantray Chauhan, Ki Ho Park

10:20 Trend-based analysis of visual field data
Felipe Medeiros

10:40 Visual field and structural progression in the ADAGES
Linda Zangwill

11:00 Choroidal microvascular and progression
Tae-Woo Kim

11:20 Directional OCT and OCT-A in imaging glaucomatous optic nerve head deformation
Brad Fortune

11:40 DARC and progression
Francesca Cordeiro

12:00 - 13:30 | Prince Hall - Ground Floor
Lunch

13:30 - 15:00 | Archibald Room
Parallel Workshop I
Outcome measures for clinical trials of neuroprotection
Facilitators: David Garway-Heath and Christopher Leung

13:30 - 15:00 | KTS lecture Hall
Parallel Workshop II
Why do retinal ganglion cells die in glaucoma?
Facilitators: Adriana Di Polo and Nicolas Marsh-Armstrong

15:00 Break

15:30 - 17:10 | Alumni Hall
Session 3 - IOP and disease: causes and therapy
Moderators: Claude Burgoyne, Leonard Levin

15:30 Molecular signature of human outflow cells by single-cell transcriptomics
Daniel Stamer

15:50 Trabecular meshwork stiffness: In vivo measurement and relationship to function
C. Ross Ethier

16:10 Laser trabeculoplasty
Gus Gazzard

16:30 Application of multiphoton imaging: Insights into collagen remodelling and the future of anti-fibrotic strategies
Tina Wong

16:50 Stem cell therapy
Joel Schuman
08:20 - 09:30 | Alumni Hall
Session 4 - Lightning talks 1
Moderators: Henry Jampel, Marcelo Nicolela

08:20 What part of the clinical examination correlate with how patients feel?  
George Spaeth

08:30 Patient related outcomes in the assessment of novel glaucoma surgical devices  
Kuldev Singh

08:40 Patterns of physical activity in glaucoma  
Pradeep Ramulu

08:50 Increased retinal venous pressures are a risk factor in glaucoma  
Lutz Pillunat

09:00 Aqueous lipid mediator as a marker of chronic IOP elevation in open-angle glaucoma  
Makoto Aihara

09:10 How SLT works? From bench to bedside  
Stefano Gandolfi

09:20 Why aren’t there more new drugs to treat glaucoma?  
Gary Novack

09:40 Break

10:20 - 10:50 | Alumni Hall
Session 5 - Goldmann Lecture
Big data and critical thinking in the search for value
Introduction: Balwantray Chauhan
Speaker: Anja Tuulonen

10:55 - 11:55 | Alumni Hall
Business Meeting

12:00 - 13:30 | Prince Hall - Ground Floor
Lunch

08:00 - 09:40 | Alumni Hall
Session 6 - Molecular mechanisms underlying ganglion cell death
Moderators: Keith Martin, Janey Wiggs

08:00 Neurovascular coupling impairment in glaucoma  
Adriana Di Polo

08:20 Glaucoma-associated OPTN mutations increase transmitography  
Nicolas Marsh-Armstrong

08:40 Complement activation  
Monica Vetter

09:00 Improving translational fidelity: lessons from Sigma-1 receptor neuroprotection  
Leonard Levin

09:20 Nicotinamide and pyruvate for neuroenhancement in open-angle glaucoma  
Jeffrey Liebmann

09:40 Break

10:10 - 11:50 | Alumni Hall
Session 7 - New insights into disease mechanisms
Moderators: Louis Pasquale, Ursula Schlötzer-Schrehardt

10:10 EFEMP1 and juvenile open-angle glaucoma  
Janey Wiggs

10:30 APBB2 and primary open-angle glaucoma  
Tin Aung

10:50 Multi-ethnic primary open-angle glaucoma GWAS  
Jamie Craig

11:10 CYP39A1 rare variants and exfoliation syndrome  
Chiea Chuen Khor

11:30 Metabolomic profile of exfoliation glaucoma in pre-diagnostic plasma  
Jae Hee Kang

11:50 - 13:00 | Prince Hall - Ground Floor
Lunch
13:00 - 14:00 | Alumni Hall
Session 8 - Lightning talks 2
Moderators: Wallace L. Alward, Abbot Clark

13:00  APP-A4 demonstrates axonal transport block in human glaucoma
       Donald Minckler

13:10  Lamina cribrosa astrocytes are possibly unique
       Harry Quigley

13:20  Optic nerve head myopic alteration: conceptual and clinical implications
       Claude Burgoyne

13:30  Lamina cribrosa tissue stiffness is a fundamental driver of glaucomatous cupping
       Colm O’Brien

13:40  Functional genomics reveal metabolic pathways involved in pseudoexfoliation
       Ursula Schlötzer-Schrehardt

13:50  Pseudoexfoliation: true or false
       Alan Robin

14:00  Break

14:20 - 16:00 | Alumni Hall
Session 9 - Glaucoma models: animals and cells
Moderators: Claude Burgoyne, Christopher Leung

14:20  An ocular hypertensive model in human organ donors
       Christopher Girkin

14:40  Tissue plasminogen activator in MYOC mutant mice
       John Danias

15:00  Inducible rodent models of glaucoma
       Abbot Clark

15:20  TBK1 transgenic mouse
       John Fingert

15:40  Induced-pluripotent stem cells for ganglion cell differentiation
       Thomas Johnson

16:00  Meeting adjourns
General Information

Meeting Location
The GRS 2022 meeting will be held in the campus of the University of King’s College. It is located adjacent to Dalhousie University and within walking distance to the city centre.

University of King’s College
6350 Coburg Road, Halifax, NS, Canada B3H 2A

Meeting Rooms
All main sessions will be held in the Alumni Hall (Plenary Hall), located in the New Academic Building Main Floor, while the Workshops scheduled on Thursday, August 25 in the following rooms

Workshop I: Outcome measures for clinical trials of neuroprotection
Archibald Room - 3rd Floor

Workshop II: Why do retinal ganglion cells die in glaucoma?
KTS lecture Hall - 2nd Floor

Registration Desk
The Organising Secretariat Desk will be located in the New Academic Building, adjacent to Alumni Hall, and will be open for registration and information according to the following schedule:

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<th>Day</th>
<th>Time</th>
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<tbody>
<tr>
<td>Wednesday, August 24</td>
<td>15:00 – 17:00</td>
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<tr>
<td>Thursday, August 25</td>
<td>07:30 – 17:00</td>
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<td>Friday, August 26</td>
<td>07:30 – 13:30</td>
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<tr>
<td>Saturday, August 27</td>
<td>07:30 – 17:00</td>
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Please collect the meeting kit at the Secretariat Desk and wear your name badge during the scientific sessions and social activities.

Certificate of Attendance
The certificate of attendance will be delivered by email to all attendees after the meeting.
General Information

Slide Preparation and Preview
You can preview your slides in the Alumni Hall, the main meeting room, at the speaker ready corner. Alumni Hall is equipped with a PC (for PowerPoint) and Apple Macintosh computer (for PowerPoint or Keynote). Presentations must be loaded on the central computers at least two hours prior to the start of the session. Speakers are advised to check their presentations beforehand to ensure that the presentation runs as intended. Presentations cannot be made from the speaker’s own computer.

Catering
Coffee breaks and buffet lunches are included in the delegate registration fee. All the delegates and registered accompanying persons are welcome to join the Social Events included in the registration fee (please see Social Events section for further information).

Dress code
The dress code will be informal for all sessions and social events.

Insurance
The organisers are not responsible for individual medical, travel or personal insurance. Registrants and accompanying persons should arrange their own coverage.

Contact Information
For assistance, please contact the Organising Secretariat:
OIC srl - Organizzazione Internazionale Congressi
Viale Giacomo Matteotti, 7 - 50121 Florence (Italy)
Tel. +39 055 50351 | infoGRS@oic.it

Your OIC staff assistance on site in Halifax:
Manuela Busoni +39 366 7220106 | m.busoni@oic.it
Dianora Saccomani +39 377 7052454 | facultyGRS@oic.it

Social Events

Wednesday, August 24
18:00 - 19:30 | Welcome Reception - Halifax Citadel
Address: Halifax Citadel National Historic Site, 5425 Sackville St, Halifax
All registered delegates and registered accompanying persons are invited to this reception. There will be a guided tour of this National Historic site. We will be accompanied by a local piper while we enjoy local wines and delicacies. Citadel Hill is within walking distance of the Lord Nelson and Atlantica Hotels. Please be aware that reaching the Citadel involves a gentle uphill walk and therefore those with mobility issues may elect to take a taxi.

Thursday, August 25
18:30 - 22:30 | Canadian Museum of Immigration and Dinner at Pier 21
Address: Canadian Museum of Immigration and Dinner at Pier 21, 1055 Marginal Road, Halifax
All registered delegates and registered accompanying persons will visit Canada’s national museum of immigration, which occupies part of Pier 21, the former ocean liner terminal and immigration shed from 1928 to 1971. Pier 21 is Canada’s last remaining ocean immigration shed. After the guided tour the evening will continue with a cocktail and a dinner reception inside the Museum.

Transportation will be provided only by the two GRS suggested hotels:
18:00 Meeting point in the lobby of Atlantica Hotel
18:20 Meeting point in the lobby of Lord Nelson Hotel

Saturday, August 27
16:10 - 17:00 | Helios Vocal Ensemble performance - “The Universal Language”
King’s College Chapel
Helios Vocal Ensemble is Atlantic Canada’s premier vocal ensemble, performing sacred and secular music from the Renaissance and beyond. Founded in 2015, they have already appeared in many of the region’s leading chamber music series, including the Indian River Festival, Cecilia Concerts, the Three Churches Festival, Musicae Royale, and the Music Room Chamber Players series, as well as several festivals in Quebec. Their debut recording, “An Illuminated Christmas”, was nominated for Classical CD of the Year in 2018 by Music Nova Scotia. Members include Eszter Horvath (soprano), former music director at All Saints Cathedral, Halifax; Andrew Pickett (alto), former lay clerk at Manchester Cathedral; Michael van der Gaag (tenor), National Youth Choir alumnus; and Spencer Gough (bass). Dominique Saulnier (soprano) will be joining them for this performance.

Saturday, August 27
18:30 - 22:30 | Lobster Dinner at Saint Mary’s Boat Club
Address: Saint Mary’s Boat Club, 1641 Fairfield Rd, Halifax
All registered delegates and registered accompanying persons are invited to Saint Mary’s Boat Club and enjoy the iconic famous lobster. Built in 1905 and renovated in 1991, St. Mary’s Boat Club offers a unique event venue overlooking the Northwest Arm in Halifax’s South End.

Transportation will be provided only by the two GRS suggested hotels:
18:00 Meeting point in the lobby of Atlantica Hotel
18:20 Meeting point in the lobby of Lord Nelson Hotel
Optional Tour
Not included in the registration fee

Friday, August 26
Visit at Grand-Pré National Historic Site with dinner at Lightfoot & Wolfville

13:30 Meeting Point at King’s College
20:30 Return to Halifax and drop-off point at Lord Nelson Hotel and Atlantica Hotel

Kilted tour guide of Grand-Pré followed by wine tasting at Benjamin Bridge and dinner at Lightfoot & Wolfville.

Accompanying Person Optional Program

We suggest the following optional tours for Accompanying Persons:

Thursday, August 25
Lunenburg & Mahone Bay Tour by Bus (10:00 - 16:00)

Friday, August 26
Harbour Hopper (10:15 – 11:10)

Saturday, August 27
Peggy’s Cove (09:30 – 12:30)

To organize these tours please check details at the following web site: www.ambassatour.com

The GRS is pleased to welcome the following guests to the 2022 meetings. Guests of GRS Members are those who are felt by the inviting member to be future GRS members. We are especially happy to welcome guests from regions underrepresented in the GRS membership and are grateful to Allergan, CenterVue, Santen and Topcon for their generous support.

Guests of GRS Members
- Ryo Asaoka
- Michael Boland
- Crawford Downs
- Sara Giammaria
- Jin Wook Jeoung
- Thomas Johnson
- Rachel Kuchey
- Sameh Mosaed
- Karin Pillunat
- Ian Pitha
- Aaki Shukla
- Josh Stein
- Michelle Tian Sun
- Gadi Wollstein

Inviting GRS Member
- Araie Makoto
- David Friedman
- Colm O’Brien
- Balwantray Chauhan
- Ki Ho Park
- Pradeep Ramulu
- Henry Jampel
- Donald Minckler
- Lutz Pillunat
- Harry Quigley
- Jeffrey M. Liebmann
- Alan Robin
- Kuldev Singh
- John Danias

Guests of Program Committee (Invited Speakers)
- Jae Hee Kang
- Chiea Chuen Khor

Guests of Host Country
- Brennan Eadie
- Lesya Shuba
- Jeremy Sivak
- Jayme Vianna

Guests from Regions Underrepresented in the GRS Membership
- Virna Dwi Oktariana Asrory (Indonesia)
- Alina Popa Cherecheanu (Romania)