



International Union of Radio Science

U.S. Commission B

J. Simpson, Chair
R. Baktur, Secretary
S. Sharma, Technical Activities Chair

B. Notaros, Vice-Chair
S. Weiss, Membership Chair

Please reply to: Reyhan Baktur, reyhan.baktur@usu.edu, phone: (435) 797-2955, fax: (435) 797-3054

MINUTES USNC-URSI Commission B Business Meeting
2018 USNC-URSI Radio Science Meeting
Boston, MA, USA
July 9, 2018

1. Chair Jamesina Simpson called the meeting to order at 5:00 p.m.
2. Welcome to members and guests.
3. Guests introduced themselves.
4. Chair thanked Ed Rothwell for his membership chair work.

5. Chair Report

- Jamesina Simpson introduced the USNC-URSI and international URSI officers.
- One may apply for an international URSI individual membership for URSI at www.ursi.org.
- USNC-URSI Website is <http://sites.nationalacademies.org/PGA/biso/URSI/index.htm>
- Upcoming conferences listed (please see Jamesina Simpson's presentation slides for details).
- Sembiam Rengarajan talked about EMTS. The conference is coming back to the US after 4 decades. He encouraged everyone to participate and asked professors to encourage their students to participate.
- Please contact Ross Stone for proposals for future conferences.

6. Committee Report-- Membership Committee

- There was no nomination this time.
- Jamesina Simpson encouraged colleagues to become members.

7. Technical Activity Report

- Satish Sharma presented the technical report. The presentation slides are attached at the end of this minutes.
 - Yahya Rahmat-Samii asked how many papers were one page and how many were two pages.
 - Satish offered to provide it later on.
 - Ross Stone said the number of two-page papers was very few last year.
 - Branislav Notaros concurred that it was very few.
 - Yahya Rahmat-Samii said we should encourage students to submit two-page papers as they go on IEEE Xplore.
 - Volunteers are needed for the Student Paper Competition and paper reviewing process. Please contact Jamesina Simpson or Satish Sharma if you would like to volunteer.
8. Reyhan Baktur asked if the minutes of the previous meeting should be approved before adjourning the meeting.
- Ross Stone stated a motion to approve the minutes.
 - Motion seconded, and voted to approve.
 - Minutes approved.
9. Chair Report-- Old Business
None.
10. Chair Report-- New Business
None.
11. Meeting adjourned.

Minutes taken and respectfully submitted by Reyhan Baktur, Secretary.

Guests in Attendance

Roberto Graglia (Politecnico di Torino), Jose Marinez Lorenzo (Northeastern University), Nizamuddin Hussain (McGill University)

Members in Attendance

Chattopadhyay Goutam, Wenchao Chew, Cynthia Furse, Peter Hansen, Ahmed Hassan, Ahmad Hoorfar, Stuart Long, Robert Nevels, Payal Majumdar, Yahya Rahmat-Samii, Sembiam Rengarajan, Sudhakar Rao, Satish Sharma, Gary Brown, James Breakall, Salvatore Campione, Danilo Erricolo, Atef Elsherbeni, Michael Havrilla, David Jackson, Michael Jensen, Ramakrishna Janaswamy, Akira Ishimaru, Asimina Kiourti, Joseph Kotulski, Majid Manteghi, Robert Mailloux, Ronald J. Marhefka, Branislav Notaros, Jamesina Simpson, Jeffrey Nanzer, Niru Nahar, Sima Noghianian, Eric Mokole, Maria Pour, Jiming Song, Kubilay Sertel, Ross Stone, Donald Wilton, Piergiorgio Uslenghi, Karl Warnick, Steven Weiss, Richard Ziolkowski

USNC-URSI Commission-B Business Meeting

Monday, 9 July 2018
5:00 – 6:00 p.m.

2018 IEEE AP-S International Symposium and
USNC-URSI National Radio Science Meeting
Boston, MA
July 8-13, 2018



- Welcome to members and guests
- Approval of the minutes of the Boulder meeting, January 2018
- CHAIR REPORT
- COMMITTEE REPORTS
 - Technical Activities Report (Satish Sharma)
 - Membership Committee
- Old business
- New business
- Adjourn



Thank you to Edward Rothwell for
his service as Membership Chair!





Steven Weiss (ARL) has agreed to serve
as our new Membership Chair!



USNC-URSI Commission B Officers 2018-2021

Chair: Jamesina Simpson (University of Utah)

Vice-Chair: Branislav Notaros (Colorado State University)

Secretary: Reyhan Baktur (Utah State University)

Chair, TAC: Satish Sharma (San Diego State University)

Chair, Membership Committee: Steven Weiss (ARL)

Webmaster: Chelsea Bock at National Academies (cbock@nas.edu)

http://sites.nationalacademies.org/pga/biso/URSI/PGA_080674



USNC-URSI Officers 2018-2021

Chair: Sembiam Rengarajan (California State University – Northridge)

Past-Chair: David Jackson (University of Houston)

Secretary and Chair-Elect: Michael Newkirk (Johns Hopkins APL)

Accounts Manager: Gary Brown (Virginia Polytechnic Institute and State University)



Individual Membership in URSI

- URSI has established Individual Members, Individual Associate Members, and Fellows
- Fellow by invitation only
- Individual Members and Associate Members by application through www.ursi.org
 - Requirements similar to USNC membership
 - Benefits: recognition, registration discounts at URSI meetings, and at some URSI cosponsored conferences (e.g., some IEEE conferences)
 - Notification of *RSB*
- USNC-URSI Commission members encouraged to apply: will be automatically endorsed by USNC



USNC-URSI Archive

<http://sites.nationalacademies.org/PGA/biso/URSI/index.htm>

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International Visitors Office
 For visa-related issues, visit [International Visitors Office](#)

Contact the IVO 

Tel: +1 202-334-2807
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BISO Events Calendar
[Events of US National Committees and international unions associated with BISO](#)

U.S. NATIONAL COMMITTEE FOR URSI

The National Academy of Sciences is the U.S. adhering body of the [International Union for Radio Science \(URSI\)](#), and NAS manages the relationship with URSI through the U.S. National Committee (USNC) for URSI. URSI is a non-governmental and non-profit organization under the [International Council for Science](#), responsible for stimulating and coordinating, on an international basis, studies, research, applications, scientific exchange, and communication in the fields of radio science.

WHAT'S NEW

2018 National Radio Science Meeting in Boulder, Colorado
 The 2018 NRSM, sponsored by the USNC-URSI, is scheduled for Thursday through Sunday, January 4 through 7, in Boulder, CO.

The USNC-URSI is also proud to host the Ernest K. Smith Student Paper Competition. Student papers and top three paper awards will be presented on **Friday, January 5**. More information is available at www.nrsmboulder.org or by contacting the Student Paper Chair, Professor Erdem Topsakal, at etopsakal@vcu.edu.

NEW: Visit the USNC-URSI Meeting Archives
 The USNC-URSI has compiled proceedings from annual NRSMs and joint Radio Science Meetings with AP-S on one webpage, located on the menu at the right of your screen under "USNC-URSI Meeting Archives." All proceedings are available as downloadable PDFs. Anyone with proceedings from a meeting that we are currently missing may contact Ross Stone at r.stone@ieee.org or Chelsea Bock at cbock@nas.edu.

URSI GASS 2017 in Montréal, Canada
 For the 32nd time since the inception of URSI, Radio Scientists from across the world gathered for the URSI General Assembly and Scientific Symposium on August 19-26, 2017 in Montréal, Canada. This conference was a unique opportunity to learn about recent advances in all fields of Radio Science, as covered by all ten URSI Commissions.

The USNC-URSI awarded 85 total travel fellowships to those attending the GASS in three different categories: 17 to graduate students, 32 to early career scientists, and 36 to commission members. URSI was also able to award numerous GASS travel grants as part of its Young Scientists Program, supported by the French and Japanese Member Committees. The complete list of award finalists is

USNC-URSI

- [Home](#)
- [Background](#)
- [Officers](#)
- [Constitution](#)
- [Meeting Calendar](#)
- [USNC-URSI Meetings Archives](#)
- [Membership](#)
- [Activities and Events](#)
- [Scientific Commissions](#)
- [Awards](#)
- [URSI International Webpage](#)
- [Related Links](#)

Contact the USNC-URSI

[David R. Jackson](#), Chair
[Sembiam Rengarajan](#), Secretary
[Steven C. Reising](#), Immediate Past Chair





Upcoming Conferences of Interest

- 2018 IGARSS, Valencia, Spain, July 23-27
- 2018 ANTEM, Aug. 19-22
- 2018 ICEAA / IEEE APWC, Columbia, Sept. 10-14
- 2018 ISAP, Busan, Korea, Oct. 23-26
- 2019 AP-RASC, New Delhi, India, March 9-15
- **2019 URSI Commission B EMTS, San Diego, CA, May 27-31**
- 2019 IEEE APS/URSI Symposium, Atlanta, GA, July 7-12
- 2020 IEEE APS/URSI Symposium and North American Radio Science Meeting, Montreal, Canada, July 19-24 **(there will not be a USNC-URSI meeting in Boulder in 2020)**
- 2020 URSI GASS 2020, Rome, Italy, Aug 29 – Sept 5
- 2021 IEEE APS/URSI Symposium, Singapore, July 10-16



Other Discussion Items

- Encourage students and young scientists to become Early Career Members.
- Encourage colleagues to become Members or Associate Members.



Future Conferences

- The Joint Meetings Committee is actively seeking proposals for 2022 and later.
- Contact Ross Stone or Roberto Graglia if you want information on how to propose.

Commission-B
Business Meeting

Committee Report



Board on International Scientific Organizations

U.S. National Committee for the
International Union of Radio Science

National Academy of Sciences

Technical Activities Report: Satish Sharma

Commission-B
Business Meeting

Committee Report



Board on International Scientific Organizations

U.S. National Committee for the
International Union of Radio Science

National Academy of Sciences

Membership Committee: N/A

Commission-B Business Meeting



Board on International Scientific Organizations

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- ❖ Old Business?
- ❖ New Business?
- ❖ Adjourn



URSI Commission-B Special Sessions & Stats

**9 July 2018
Boston**

**Satish K. Sharma
San Diego State University**



2018 IEEE International Symposium on Antennas and Propagation/USNC-URSI National Radio Science meeting, July 8–13, 2018, **Boston**, MA

Papers submitted, accepted, rejected, and withdrawn

(Breakdown: AP, URSI, URSI from US authors, URSI from non-US authors)

Submitted	Accepted	Rejected	Withdrawn
Total Submitted: 1830	Total Accepted: 1708	Total Rejected: 74	Total Withdrawn: 60
- AP Submitted: 1422	- AP Accepted: 1312	- AP Rejected: 72	- AP Withdrawn: 38
- URSI Submitted: 408	- URSI Accepted: 396	- URSI Rejected: 1	- URSI Withdrawn: 11
- URSI from US: 214	- URSI from US: 210	- URSI From US: 1	- URSI from US: 03
- URSI from non-US: 194	- URSI from non-US: 186	- URSI From non-US: 0	- URSI from non-US: 08

2017 IEEE International Symposium on Antennas and Propagation/USNC-URSI National Radio Science meeting, July 9–14, 2017, **San Diego**, California

Papers submitted, accepted, rejected, and withdrawn

(Breakdown: AP, URSI, URSI from US authors, URSI from non-US authors)

Submitted	Accepted	Rejected	Withdrawn
Total Submitted: 1946	Total Accepted: 1792	Total Rejected: 67	Total Withdrawn: 87
- AP Submitted: 1507	- AP Accepted: 1380	- AP Rejected: 67	- AP Withdrawn: 60
- URSI Submitted: 438	- URSI Accepted: 412	- URSI Rejected: 0	- URSI Withdrawn: 27
- URSI from US: 254	- URSI from US: 240	- URSI From US: 0	- URSI from US: 14
- URSI from non-US: 184	- URSI from non-US: 172	- URSI From non-US: 0	- URSI from non-US: 13

2018 IEEE International Symposium on Antennas and Propagation/USNC-URSI National
Radio Science meeting, July 8–13, 2018, **Boston**, MA

Papers submitted, accepted, rejected, and withdrawn

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- URSI from non-US: 194	- URSI from non-US: 186	- URSI From non-US: 0	- URSI from non-US: 08

2016 IEEE International Symposium on Antennas and Propagation/USNC-URSI National
Radio Science meeting, June 26 - July 1, 2016, Fajardo, **Puerto Rico**

Papers submitted, accepted, rejected, and withdrawn

(Breakdown: AP, URSI, URSI from US authors, URSI from non-US authors)

Submitted	Accepted	Rejected	Withdrawn
Total Submitted: 1620	Total Accepted: 1458	Total Rejected: 77	Total Withdrawn: 76
- AP Submitted: 1218	- AP Accepted: 1100	- AP Rejected: 67	- AP Withdrawn: 45
- URSI Submitted: 402	- URSI Accepted: 358	- URSI Rejected: 10	- URSI Withdrawn: 31
- URSI from US: 233	- URSI from US: 217	- URSI From US: 1	- URSI from US: 8
- URSI from non-US: 169	- URSI from non-US: 141	- URSI From non-US: 9	- URSI from non-US: 23

2018 IEEE International Symposium on Antennas and Propagation/USNC-URSI National
Radio Science meeting, July 8–13, 2018, **Boston**, MA

Papers submitted, accepted, rejected, and withdrawn

(Breakdown: AP, URSI, URSI from US authors, URSI from non-US authors)

Submitted	Accepted	Rejected	Withdrawn
Total Submitted: 1830	Total Accepted: 1708	Total Rejected: 74	Total Withdrawn: 60
- AP Submitted: 1422	- AP Accepted: 1312	- AP Rejected: 72	- AP Withdrawn: 38
- URSI Submitted: 408	- URSI Accepted: 396	- URSI Rejected: 1	- URSI Withdrawn: 11
- URSI from US: 214	- URSI from US: 210	- URSI From US: 1	- URSI from US: 03
- URSI from non-US: 194	- URSI from non-US: 186	- URSI From non-US: 0	- URSI from non-US: 08

2015 IEEE AP-S Int. Symposium & North American URSI Mtg., **Vancouver**, BC, Canada

Papers submitted, accepted, rejected, and withdrawn

(Breakdown: AP, URSI, URSI from US authors, URSI from Canadian authors)

Submitted	Accepted	Rejected	Withdrawn
Total Submitted: 1974	Total Accepted: 1867	Total Rejected: 105	Total Withdrawn: 31
- AP Submitted: 1392	- AP Accepted: 1301	- AP Rejected: 89	- AP Withdrawn: 24
- URSI Submitted: 572	- URSI Accepted: 549	- URSI Rejected: 16	- URSI Withdrawn: 7
- URSI From US: 328	- URSI from US: 322	- URSI From US: 6	- URSI from US: 6
- URSI From Canada: 56	- URSI from Canada: 56	- URSI From Canada: 0	- URSI from Canada: 0

2018 IEEE AP-S International Symposium & USNC-URSI Meeting, **Boston**, MA

URSI	Submitted Papers	Accepted Papers	Withdrawn Papers	Sessions
A	27	27	0	4
B	226	216	6	29
C	25	25	0	3
D	0	0	0	0
E	13	13	0	2
F	41	39	2	4
G	4	4	0	1
J	0	0	0	0
K	22	20	2	3
URSI Special	53	52	1	0
Total	411	396	11	46

2017 IEEE AP-S International Symposium & USNC-URSI Meeting, **San Diego**, California

URSI	Submitted Papers	Accepted Papers	Withdrawn Papers	Sessions
A	34	32	2	4
B	233	224	9	34
C	20	16	4	3
D	10	6	4	1
E	10	9	1	1
F	54	52	2	7
G	0	0	0	0
J	0	0	0	1
K	23	20	3	3
URSI Special	54	52	2	0
Total	438	411	27	54

2018 IEEE AP-S International Symposium & USNC-URSI Meeting, **Boston**, MA

URSI	Submitted Papers	Accepted Papers	Withdrawn Papers	Sessions
A	27	27	0	4
B	226	216	6	29
C	25	25	0	3
D	0	0	0	0
E	13	13	0	2
F	41	39	2	4
G	4	4	0	1
J	0	0	0	0
K	22	20	2	3
URSI Special	53	52	1	0
Total	411	396	11	46

2016 IEEE AP-S International Symposium & USNC-URSI Meeting, Fajardo, **Puerto Rico**

URSI	Submitted Papers	Accepted Papers	Sessions
A	29	23	3
B	217	195	27
C	19	17	3
D	7	7	1
E	7	7	1
F	48	38	6
G	0	0	0
J	2	2	1
K	15	14	3
URSI Special	58	55	0
Total	402	358	64

2018 IEEE AP-S International Symposium & USNC-URSI Meeting, **Boston**, MA

URSI	Submitted Papers	Accepted Papers	Withdrawn Papers	Sessions
A	27	27	0	4
B	226	216	6	29
C	25	25	0	3
D	0	0	0	0
E	13	13	0	2
F	41	39	2	4
G	4	4	0	1
J	0	0	0	0
K	22	20	2	3
URSI Special	53	52	1	0
Total	411	396	11	46

2015 IEEE AP-S Int. Symposium & North American URSI Mtg., **Vancouver**, BC, Canada

URSI	Submitted Papers	Accepted Papers	Sessions
A	28	27	3
B	292	279	35
C	13	13	2
D	10	9	2
E	12	10	1
F	80	78	10
G	6	4	1
J	10	10	1
K	47	46	7
URSI Special	74	73	1
Total	572	549	64

2018 IEEE AP-S/URSI Boston

URSI B Sessions – UB (28 sessions, 216 papers)

MO-UB.1A: Metamaterials: Part I

MO-UB.1A: Metamaterials: Part II

MO-UB.2P: Reconfigurable Arrays

TU-UB.1A: Numerical Methods: Part I

TU-UB.2A: Conformal and Curved Antenna Arrays

TU-UB.1P: Numerical Methods: Part II

TU-UB.2P: Applications of Electrically Small Antennas

TU-UB.3P: Antenna Array Theory and Measurement

TU-UB.4P: Electromagnetic Coupling and Interactions

WE-UB.1A: Numerical Methods: Part III

WE-UB.2A: Antenna Arrays in Advanced Applications

WE-UB.1P: Antenna Characterization and Design

WE-UB.2P: Imaging, Inverse Scattering and Remote Sensing: Part I

TH-UB.1A: Printed Antennas and Arrays

TH-UB.2A: Guided Waves and Waveguiding Structures

TH-UB.1P: Sensor Network and Cognitive Radio

THP-UB.1P: Frequency Selective Surfaces and Filters

THP-UB.2P: High Frequency Techniques and Metamaterials

THP-UB.3P: Nanoscale Electromagnetics

FR-UB.2A: Radio Wave Propagation and Scattering Effects

FR-UB.4A: Low noise and periodic devices

FR-UB.1A: MIMO Antennas and Systems

FR-UB.3P: Millimeter Wave and Terahertz Antennas

FR-UB.5P: Differential Equation Methods

FR-UB.3A: Numerical Methods: Part IV

FR-UB.1P: Metamaterials: Part III

FR-UB.2P: Complex, Novel or Specialized Media

UB.4P: UWB Electromagnetics and Wireless Communications

One missing as per table provided by Lance

2018 IEEE AP-S/URSI Boston

AP-S/URSI Joint Special Sessions – (16 sessions) + 2 are APS only

Innovative Phased Array Architectures and Beamforming Technology

Applications of Electromagnetics in Medicine and Biology

Implantable Devices for Wireless Biomedical Telemetry

Emerging Approaches and Future Trends in Electromagnetic Inverse Problems

Advances in Commercial Electromagnetic Simulation Tools

Gap waveguide and other antenna technologies for mm-wave applications

Modern A

Wideban

in Mobile

Functiona

EM Propo

Measure

GAP Wa

Characte

Next Gen

Reconfigurable RF Circuits for Wideband Antenna Systems

Advances in Steering the Beam of High Gain Antennas

Millimeter and Submillimeter wave Metasurfaces for Radar and Communication Systems

3-D Printed Antennas and Components for Practical RF Applications

Additive Manufacturing in Antennas and RF Systems

For Reference:

2012 APS/URSI Chicago, IL: 13 APS/URSI Joint Special Sessions

2013 APS/URSI Orlando, FL: 10 APS/URSI Joint Special Sessions

2014 APS/URSI Memphis, TN: 16 APS/URSI Joint Special Sessions

2015 APS/URSI Vancouver, Canada: 19 APS/URSI Joint Special Sessions

2016 APS/URSI Puerto Rico: 16 APS/URSI Joint Special Sessions

2017 APS/URSI San Diego: 18 APS/URSI Joint Special Sessions

2018 APS/URSI Boston: 16 APS/URSI Joint Special Sessions (+2 are APS only)

2018 National Radio Science Meeting

Conference Statistics

Total number of pre-registrants: 356

Total abstracts and summaries submitted: 416

Total abstracts and summaries accepted: 414

Number of sessions: 59

Total number of Student Travel Grant Award applications: 128

	2018	2017	2016	2014	2013	2012	2011
Total No. of papers	414	421	375	399	364	369	358
Total No. of sessions	59	56	49	54	47	47	49
Total No. of travel grants	128	137	122	115	100	104	113

National Radio Science Meeting

Conference Statistics

Year	# Papers	# Sessions	# Travel Grants
2011	358	49	113
2012	369	47	104
2013	364	47	100
2014	399	54	115
2015	NARSM	NARSM	NARSM
2016	375	49	122
2017	425	56	137
2018	414	59	128

2017 and 2018 National Radio Science Meeting Conference Statistics

2017		2018	
Country	Papers		Papers
United States	404	United States	390
Canada	6	Canada	9
South Africa	4	Taiwan	3
Kuwait	3	Russian Federation	2
?	2	Czech Republic	2
Japan	1	Japan	2
France	1	France	2
China	1	Turkey, South Korea, Nigeria, India, China (1 each)	5
Brazil	1		
Australia	1		
Total	424	Total	416

2017: About 5% of the papers (20 papers) have come from outside the U.S.

2018: About 6% of the papers (25 papers) have come from outside the U.S.

Commission B Special Sessions, 2018 USNC-URSI NRSM, Boulder, Colorado

10 B special sessions, 70 papers, 8 B regular sessions, 51 papers (total URSI: **59 sessions, **414** papers)**

Special Session Title	No. of Papers	Organizers
1. Millimeter-Wave and 5G Antennas and Systems	6	Shubhendu Bhardwaj, Florida Int. Univ., & Joshua Kovitz, Georgia Tech
2. Nonmagnetic and Nonreciprocal Devices	7	Ethan Wang, UCLA, & Andrea Alu, Univ. of Texas
3. Advances in Computational Electromagnetics on Modern Computers	5	Ali Yilmaz, Univ. of Texas, & Zhen Peng, Univ. of New Mexico
4. Emerging Applications of Phased Arrays	7	Karl Warnick, BYU, & Elias Alwan, Florida Int. Univ.
5. Adv. Theory & Applications of Metamaterials	9	Filippo Capolino, UC Irvine, & Ashwin Iyer, Univ. of Alberta
6. Adv. Analysis, Design, & Appl. of WG Structures	10	Michael Havrilla, Air Force Ins of Tech, & Edward Rothwell, Michigan State
7. Wearable Antennas and Electronics	7	Asimina Kiourti, Ohio State, & Bashir Morshed, Univ. of Memphis
8. Antennas for Specialized Platforms: SmallSats, UAVs, and UUVs	5	Reyhan Baktur, Utah State, & David Jackson, Univ. of Houston
9. 3D Printed Antennas	9	Hao Xin, Univ. of Arizona, & Jacob Adams, North Carolina State
10. Techniques for Modeling of Waves in Plasmas (BGH)	5	Robert Marshall, Robert Lysak, Mark Golkowski

Commission B Regular Sessions, 2017 USNC-URSI NRSM, Boulder, Colorado

10 regular sessions, 75 papers (total URSI: **56** sessions, **421** papers)

Regular Session Title	No. of Papers	Chairs
1. B3: Antennas	10	Dejan Filipovic, University of Colorado Boulder; Karl Warnick, Brigham Young University
2. B4: Scattering	5	Alex Yuffa, National Institute of Standards and Technology; Piergiorgio Uslenghi, University of Illinois at Chicago
3. B5: Liquid Metal Antennas	5	Jacob Adams, North Carolina State University; William Davis, Virginia Tech
4. B6: Complex Media and Nanoelectromagnetics	10	Edward Kuester, University of Colorado Boulder; Christos Argyropoulos, University of Nebraska-Lincoln
5. B8: Inverse Scattering and Remote Sensing	5	Piergiorgio Uslenghi, University of Illinois at Chicago; Pai-Yen Chen, University of Texas at Austin
6. B9: Antenna Arrays I	9	Randy Haupt, Colorado School of Mines; Dejan Filipovic, University of Colorado Boulder
7. B13: Antenna Measurements and Simulations	8	Steven Weiss, US Army Research Lab; Jeanne Quimby, NIST
8. B14: Antenna Arrays II	8	Dejan Filipovic, University of Colorado Boulder; Gokhan Mumcu, University of South Florida
9. B16: Microstrip Antennas and Printed Devices	9	Erdem Topsakal, Virginia Commonwealth University; Ozlem Kilic, The Catholic University of America
10. B17: Numerical Methods	6	Atef Elsherbeni, Colorado School of Mines; Melinda Piket-May, University of Colorado

Commission B Special Sessions, 2019 USNC-URSI NRSM, Boulder, Colorado

Special Session Title	No. of Papers	Organizers
1. 5G and Massive MIMO Antennas and Systems		Shubhendu Bhardwaj, Florida Int. Univ., and Ghanshyam Mishra, San Diego State University
2. Astronomical Phased Arrays: From Theory to Practice (Commission B/J)		Karl Warnick, BYU and Juming Diao, UCLA
3. Metamaterials and Metasurfaces: Theory & Applications		Filippo Capolino, UC Irvine & Ashwin Iyer, Univ. of Alberta
4. Wearable Antennas and Electronics		Asimina Kiourti, Ohio State, & Bashir Morshed, Univ. of Memphis
5. Antennas for Specialized Platforms: SmallSats, UAVs, and UUVs		<u>Reyhan Baktur, Utah State, & David Jackson, Univ. of Houston</u>
6. Techniques for Modeling of Waves in Plasmas (BGH)		Robert Marshall, Robert Lysak, Mark Golkowski, Vijay Harid
7. Low-Profile Antennas from Gigahertz to Terahertz		Goutam Chattopadhyay, JPL-NASA and Satish K. Sharma, San Diego State University

Volunteers for SPC Papers/Abstracts

- We are seeking **Volunteers** to help us review the student paper competition submissions in fall and other abstracts. Please contact me with your willingness.
- Email: ssharma@sdsu.edu