Such is the new normal, a
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nizant of human density ir

As a reminder, announcements, news, and events intended for both the printed newsletter and the website, such as award announcements, calls for nominations, and upcoming conferences, can be submitted at the IT Society website http://www.itsoc.org. Articles and columns can be e-mailed to me at salim.elrouayheb@rutgers.edu with a subject line that includes the words "IT newsletter."

The next few deadlines are:

Oct 10, 2020 for the issue of December 2020.

Jan 10, 2021 for the issue of March 2021.

April 10, 2021 for the issue of May 2021.

Please submit plain text, LaTeX, or Word source files; do not worry about fonts or layout as this will be taken care of by IEEE layout specialists. Electronic photos and graphics should be in high resolution and sent as separate files.

Awards

Congratulations to the members of our community that have recently received recognition for their exceptional scholarly contributions.

Anders Lindquist: 2020 IEEE Control Systems Award

The Control Systems Award recognizes outstanding contributions to control systems engineering, science, or technology.

Balaji Prabhakar: 2020 IEEE Koji Kobayashi Computers and Communications Award

The purpose of the IEEE Koji Kobayashi Computers and Communications Award is to recognize outstanding contributions to the integration of computers and communications.

Alfred O. Hero, III: 2020 IEEE Fourier Award for Signal Processing

The Fourier Award recognizes an outstanding contribution to the advancement of signal processing, other than in the areas of speech and audio processing.

Shu Lin: 2020 IEEE Leon K. Kirchmayer Graduate Teaching Award

The Leon K. Kirchmayer Graduate Teaching Award recognizes inspirational teaching of graduate students in the IEEE fields of interest.

Robert M. Gray: 2020 Aaron D. Wyner Distinguished Service Award

The Aaron D. Wyner Distinguished Service Award of the IT Society has been instituted to honor an individual who has shown outstanding leadership in, and provided long-standing, exceptional service to, the Information Theory community.

2019 IEEE Communications Society & Information Theory Society Joint Paper Award

The purpose of the Communications Society & Information Theory Paper Award is to recognize the authors of outstanding papers appearing in any publication of the IEEE Communications Society or the IEEE Information Theory Society in the previous three calendar years.

The 2019 award winning publication is:

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- Navneeth Ramakrishnan, Imperial College London; Raban Iten, ETH Zurich. "Quantum Blahut-Arimoto Algorithms," co-authored with Volkher Scholz and Mario Berta.

2020 Information Theory Society Paper Award

The purpose of the Information Theory Paper Award is to recognize exceptional publications in the field and to stimulate interest in and encourage contributions to fields of interest of the Society.

- Emmanuel Abbe, Afonso S. Bandeira, Georgina Hall, "Exact Recovery in the Stochastic Block Model," in
  . 2, . 1,, . 4 1, 4 ,
  . 201 .

- Elchanan Mossel, Joe Neeman, and Allan Sly, "Consistency Thresholds for the Planted Bisection Model,"
  . , . 21,, . 1, 24, 201 .

IEEE Information Theory Society North Macedonia Chapter

Venceslav Kafedziski, Aleksandar Risteski

The IEEE Information Theory Society North Macedonia Chapter received the 2020 Chapter of the Year Award at the ISIT 2020 Virtual Conference in Los Angeles "for educational programs, outreach activities and the promotion of information-theory research". The Chapter was founded in 2011 upon anch". 4287for educ

Communications Society North Macedonia Chapter. There have been joint events co-organized with other chapters as well.

The IEEE IT Society North Macedonia Chapter organized a Mini Workshop on the subject of "The Applications of Machine Learning in Telecommunications", that took place on December 23rd 2019 at the Faculty of Electrical Engineering and Information Technologies, Ss Cyril and Methodius University in Skopje. The list of lecturers included Prof. Petar Popovski ("On the Use of Machine Learning Methods in Wireless IoT Connectivity"), Prof. Predrag Ivanis ("Towards Designing FTN Signaling Systems with Limited Computational Resources"), Prof. Dejan Vukobratovic ("Two Faces of Machine Learning: Model Based vs Data Based - An Intimate Story"), Prof. Gjorgji Madzarov ("Streaming Data: Big Data at High Velocity") and lecturers from the local industry. Introductory remarks were given by the Workshop organizer, Prof. Venceslav Kafedziski. The Workshop was financially supported by our IT Chapter.

Each year we provide the IEEE IT Society members and other IEEE members, as well as the wider audience, with numerous technical events, inspired by the exciting science of Information Theory. Despite the small size of the country of Republic of North Macedonia .444n T5 Tw T*[T*[(technical53.44tora b02 4toryacadem1 93.44toryt24,)] 5 (Intr)ienckeeprmatechnica15 events, ist3 of315 2ry. (.)]TJ 0.03 J 0.0irta g technical19tory"),nologitson Theory]TJ 0113ear we pr (. (gji Madzar0.6 (TJ 0 Tw 23.445 0 ki,)-7570]TJ 21.8

The first **DLR-MIT-TUM Workshop on Coding and Random Access** was held in Oberpfaffenhofen, Germany, on February 24-25, 2020. The event was organized by the Institute of Communications and Navigation of the German Aerospace Center (DLR), the Institute for Communications Engineering of the Technical University of Munich (TUM), and the Massachusetts Institute of Technology (MIT). The workshop had over 50 registered participants.

The technical program included 25 invited talks. On Monday, February 24, the speakers were A. Fengler, R. Müller, K. Andreev, A. Frolov, A. Guillén i Fàbregas, G. Kramer, A. Özgür, J.-F. Chamberland, S. Saeedi Bidokhti, M. Chiani, H. Pfister, L. Schmalen, M. Geiselhart, and A. Buchberger. On Tuesday, February 25, the speakers were A. Munari, R. Venkataramanan, D. Vukobratovic, P. Popovski, Y. Polyanskiy, A. Pradhan, E. Paolini, M. Frey, G. Durisi, G. Kabatiansky, E. Jorswieck, and G. Cocco.

The talks' topics included channel code design and decoding, machine learning applied to communications, coding for massive uncoordinated multiple access protocols, multi-user information theory, and finite-length information theory. From the insightful talks, and from the unmissable coffee break discussions, a clear direction emerged: iterative decoding algorithms, polar codes

The 2020 IEEE International-al Workshop on Privacy and Security for Informa-tion Systems (WPS 2020) took place during the 2020 IEEE Conference on Com-munications and Network Security (CNS 2020) vir-tually on July 1, 2020. The main topics of the work-shop were security and privacy for biometrics, 5G, IoT, and database search

- **Physical Layer Authentication Techniques Based on Machine Learning with Data Compression**
  Linda Senigagliesi, Marco Baldi, and Ennio Gambi

- **Adversarial Multiple Access Channels and a New Model of Multimedia Fingerprinting Coding**
  Grigory Kabatiansky and Elena Egorova

- **Modeling Temperature Behavior in the Helper Data for Secret-Key Binding with SRAM PUFs**
  Lieneke Kusters, Alexandros Rikos, and Frans MJ Willems

Perhaps the main problem that we had to address after the decision of going virtual and the choice of the conference platform were: 1) how to coordinate logistically the functions provided by CMS with those provided by CC, with the additional complication that the only solution for handling registrations was through EDAS. In this respect, we had to coordinate three different companies with different backhand systems and data infrastructure. This was possible not without some pain and a significant number of email exchanges, thanks to the wonderful cooperation and availability of CMS and CC, and the invaluable help of our finance chair, who managed the EDAS registration interface; 2) how to shape up the program, seeking a satisfactory tradeoff between non-real time and live events and, above all, taking into account implementation simplicity and reliability. In this respect, it became apparent that organizing pre-recorded paper presentations in sessions, allocated to time slots over the ISIT week, was completely meaningless. On one hand, most attendees would be on very different time zones, such that the number of people able to be online at given times would have been small, and therefore frustrating for the papers' authors. On the other hand, it makes no sense to "play synchronously" pre-recorded video presentations at the same time. In a live event, parallel sessions and papers presented at the same time is a necessity (after all, a day has only 24 hours). But for pre-recorded presentations, asynchronous on-demand access is much more efficient and much more meaningful. In addition, we are all already biased to consume multimedia material in this way, by platforms such as YouTube, Netflix, Hulu and so on. While for technical papers asynchronous on-demand access is best, for events such as plenary talks, tutorials, panels, and ITsoc events (awards and the Shannon Award announcement), a live webinar format was chosen. We decided to have a single live track per day, with events concatenated in sequence. This avoided timing problems, and significantly simplified the practical technical aspects, by allowing a single active Zoom webinar in each day.

As a final icing on the cake, just one week before ISIT we received an email from Alon Orlitsky and Christina Fragouli, proposing an open screening of "The Bit Player" on the last conference day (Friday) followed by a panel discussion as a conclusive event. This even turned out to be quite successful, despite some technical problems related to the live streaming of the long video via the Zoom Webinar platform. Overall, this was a really nice conclusion for an exciting week.

Although the virtual ISIT 2020 was far from perfect, and several aspects could have been improved with more time and planning at our disposal, the conference was quite successful and represents an interesting pilot project with several potential implications on how to run conferences in the future. Some interesting quantitative data and further considerations on what worked and what could be improved, are given in the next section.

II. How It Went

We finally organized the first virtual ISIT in the week of June 21–26, 2020, with a total of 1695 registered participants. The virtual event[1] essentially consisted of the following components:

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[1]https://2020.ieee-isit-virtual.org

- Asynchronous Technical Sessions: This is the technical program of the conference, which included all 523 accepted papers along with their video presentations that are available on demand.

- Synchronous Plenary talks and the Shannon Lecture: All four plenary talks and the Shannon lecture were delivered live on Zoom. Participants could post questions during the talk, and there was a live Q&A at the end, where the session chair relayed the questions from the audience to the speaker.

- Synchronous Tutorials/Panels: We also had three tutorials/panels on emerging topics that were organized live on Zoom. The audience could participate in the discussion by forwarding their comments/questions to the panelists during the panel, and a part of each panel was devoted to discuss the questions from the audience.

- Asynchronous Page of the Sponsors and Publishers: We had 5 generous sponsors and publishers that supported ISIT 2020. Each were provided a "virtual booth" that they could design to provide their desired contents. In particular, we had an industry session of recorded talks that were delivered by researchers from Intel, Qualcomm, and Samsung. Now Publishers also provided free access to several of the recent Foundations and Trends monographs to participants for the duration of the conference.

- Synchronous Ceremonies: The opening, closing, and award ceremonies were all organized live on Zoom. Each of these events included a host of live presenters, including Toshio Fukuda (the President of IEEE) who joined live to present the 2020 Kirchmayer award, Charles Bennett who received the 2020 Claude Shannon Award, and Alon Orlitsky who was announced as the recipient of 2021 Claude Shannon Award.

- Societal Activities: There were several events organized by the information theory society alongside of ISIT, in particular Student Video Exposition, Meet the Shannon Lecturer, and Perspective of Online Teaching. The virtual platform dedicated a page to each of these events to make their video content available to ISIT participants.

- Live Screening of "The Bit Player" movie along with a Panel Discussion: Finally, ISIT 2020 concluded with a live public screening of The Bit Player, which attracted 1524 viewers. The movie screening was also followed by a live panel with the film director/writer/producer Mark Levinson.

As mentioned earlier, we had a total of 1695 registered users who attended the virtual ISIT 2020. This is by far the largest number of attendees that ISIT has seen in its history, which demonstrates the appeal and ease of attending a virtual conference. Figure 1 further shows the number of sessions (i.e., virtual talks) and the number of page views by these registered participants during the course of the conference (June 21–June 26). This accounts for a total of 10,431 sessions and 79,309 page views during the one week period of the conference. The list of top 5 technical sessions/presentations that were viewed asynchronously (i.e, on demand) is also shown in Figure 2.

Finally, let us look at the statistics for live events of virtual ISIT (i.e., Shannon lecture, plenary talks, tutorials/panels, and award ceremonies), which is shown in Figure 3.

III. What We Learned

Looking back at our experience, some considerations are in order.

- Virtual conferences have the potential of reaching out a significantly larger audience, they are still attractive to sponsors, and provide automatically archival material (e.g., paper video presentartions, and videotapes of live events)

Katalin Marton, mathematician, passed away on December 13, 2019, after a long fight with cancer. She was a leading expert of Information Theory (IT), the first and so far only female recipient of the Shannon Award. She is survived by son Péter Frenkel, a successful mathematician.

Katalin Marton (for colleagues Kati) was born in Budapest on December 9, 1941. She studied mathematics at the Loránd Eötvös University, Budapest, where she graduated in 1965. From 1965 to 1973 she worked at the Computer Science Depart-

chains [Mc], and later she proved similar results for more general processes. She was deservedly regarded a leading expert of measure concentration, as well as of IT. The Raginsky-Sason monograph [RS] discusses her results at length in two chapters. An excellent overview of her key contributions to this field was her Shannon lecture, see [Sh].

Kati's most prestigious award was the 2012 Shannon Award, and her Shannon lecture at ISIT 2013, see [Sh], was a great success. In October 2019 she was nominated for the Noether Lecture Award of AWM-AMS. Alas, she was already terminally ill at that time. Her other awards include:

- Eötvös Wreath of the Hungarian Academy of Sciences, 2013, for outstanding academic contributions in a lifetime

- Alfréd Rényi Prize of the Rényi Institute of Mathematics, 1996, for fellows of the Institute, to recognize outstanding research performance in the previous five year period

- Géza Gru¨nwald Memorial Medal of the J. Bolyai Mathematical Society, 1972, for successful young researchers in mathematics

Kati's research work, unlike that of many leading scientists, had not been coupled with teaching or engineering applications. Neither did she hold positions in professional (let alone political) organizations. Still, as fundamental results of researchers of her

Jorma Johannes Rissanen, giant of information theory, control theory and statistics, passed away at age 87 after a long illness in Los Gatos, California, on 9 May 2020. Jorma Rissanen was perhaps best known for making arithmetic coding practical and for inventing the Minimum Description Length (MDL) principle. The importance of both contributions can hardly be overstated. Arithmetic coding is a central part of information theory; the MDL Principle has also had a profound influence on the data sciences: statistics, machine learning and data mining. It has played a central role in

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Bayesian mixture universal code was introduced in 1986, jointly with the fundamental concept of _ _ _ _ _ _ _ _ as a measure of the inherent complexity of a statistical model. By now, a whole new theory had emerged, which was eloquently described in the 1989 monograph from which we cited above. The crowning achievement came in 1996 with the paper _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ in which Shtarkov's normalized maximum likelihood code was identified as the ideal universal code to use, and its properties were analyzed. In the mean time, the work on arithmetic coding and data compression was also expanded, resulting in, for example, the data compression algorithm _ _ _ (1983) that introduced what has later been called variable-length Markov chains.

This remarkable sequence of articles was soon to be followed by an equally remarkable sequence of honors, including aforementioned best paper awards, the IEEE 1993 Richard W. Hamming medal, an IEEE Information Society Golden Jubilee Award for Technical Innovation for the invention of arithmetic coding in 1998, and, in 2009, the most important award in information theory, the IEEE Claude E. Shannon Award. Numerous further honors include two honorary doctorates, several IBM awards and foreign membership of the Finnish Academy of Science and Letters.

As regards his personal life, Rissanen was married for 64 years to Riitta Rissanen (née Aberg), and in his free time he was a passionate fan of football (soccer). In the 1950s, he seriously contemplated a professional football career. He kept playing several times a week during noon breaks at IBM San José from 1966 all the way up until his retirement in 2002 – indeed, as a tribute to Jorma, plans are under way to organize a Jorma Rissanen Soccer Cup at the next ITA conference. Jorma, atypically for the modern scientist, had no patience at all for small talk, networking and the typical conference breaks or receptions with hundreds of people present – still he was very sociable and tremendously enjoyed time in restaurants and bars with much smaller groups of close academic friends. He was a most loyal and inspiring mentor for many younger researchers (including some of the undersigned), providing essential support in building their careers. Jorma Rissanen impressed all those who had the privilege of knowing him with his commitment to stay true to his values and pursue truth through science. He is indeed famous for numerous memorable anecdotes that reflect his intransigent attitude towards science. Some of the stories have been saved for future generations in the Festschrift collection that was compiled in 2008 to honor his 75th birthday. The quotation above on his time in Sweden, taken from an interview in the Festschrift is Vintage Jorma. We strongly encourage everybody who wants to see more of his highly refreshing directness and honesty to take a look at the interview and the entertaining quotes and recollections in the Festschrift. He will be missed.

The first quotation is from the interview *A_ _ _ _ _ _ _ _ _ _ _ _ _ _ _, _ _ _ _ _ _ _ _ _ _ _, _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ (_ _ _ _ _ _ _, _ _ _ _ _ _, _ _ _ _ _ _ _ _ _, _ _ _ _ .), _ _ _ 200 .*

President's Column

alike within the society. These continuing efforts supported by the society are a reason why we are here today, with our events and publication outlets reflecting contributions from all over the world. Notably, our society is continuing to expand in IEEE regions outside of US and Canada, and we can catalyze this trend in the virtual world we live in.

In addition to society-supported activities, our community members have had excellent grassroots efforts in community-building and information exchange. Since long before it became a necessity to deliver talks online, our own newsletter editor Prof. Salim El Rouayheb has been running "The Shannon Channel" on YouTube which features talks on topics related to information theory and relevant areas including wireless networks, privacy, machine learning and optimization. Launched in 2015 (five years ago!), with typically a new talk every month, it already has about fifty archived talks with over 12000 total views. Video content is not only a preferred information source for the younger side of the community, but is a venue even those of us who still prefer a paper to an iPad screen, can appreciate as a most useful way to disseminate knowledge.

As I hope I have been able to convey, our members have always been innovative and at the forefront of community building and information dissemination. The virtual world we are currently conducting all of our operations in provides us with an excellent opportunity to unify all our efforts, update them, and develop new ones, under our society's umbrella and with its support. Our vision, which we are affectionately calling FITS (Future of Infor-

mation Theory Society), is a unified digital presence, and targets improving the value of the society membership. This is a multi-year effort that has many components including a unified digital portal, providing and storing multimedia content, being able to run our societies' meetings (of various scales), imagining new ways of interactions for our members, maintaining a more substantial social media presence (for example for technical content), providing avenues for discussions for our members, for research, for opportunities within and external to our society, and so on. Naturally, taking this on requires a lot of volunteer effort, and we are starting small this year with a few planned experiments. Among these experiments is an effort to professionally edit lectures, for archival value. Specifically, the society volunteers are working with professional editors and a few distinguished lecturers to enrich the content of the online lectures, in selected technical areas, with the goal of creating information resources for current and future members. Another experiment is the upcoming (virtual) European School of Information Theory where the society volunteers are working with the organizers to organize a virtual school that emulates some of the traits of an in-person school.

As for the upcoming ISIT and ITWs (now both in 2021), we are still in a holding pattern. But, no matter what happens in the next few months, two things are certain: the virtual components of conferences are unlikely to go away even after COVID is eradicated, and that one day, it will indeed be eradicated and we will return to normalcy again. For now, we will continue to operate virtually.

Stay well and healthy.

Recent Publications

IEEE Transactions on Information Theory

Table of content for volumes 66(6), 66(7), 66(8)

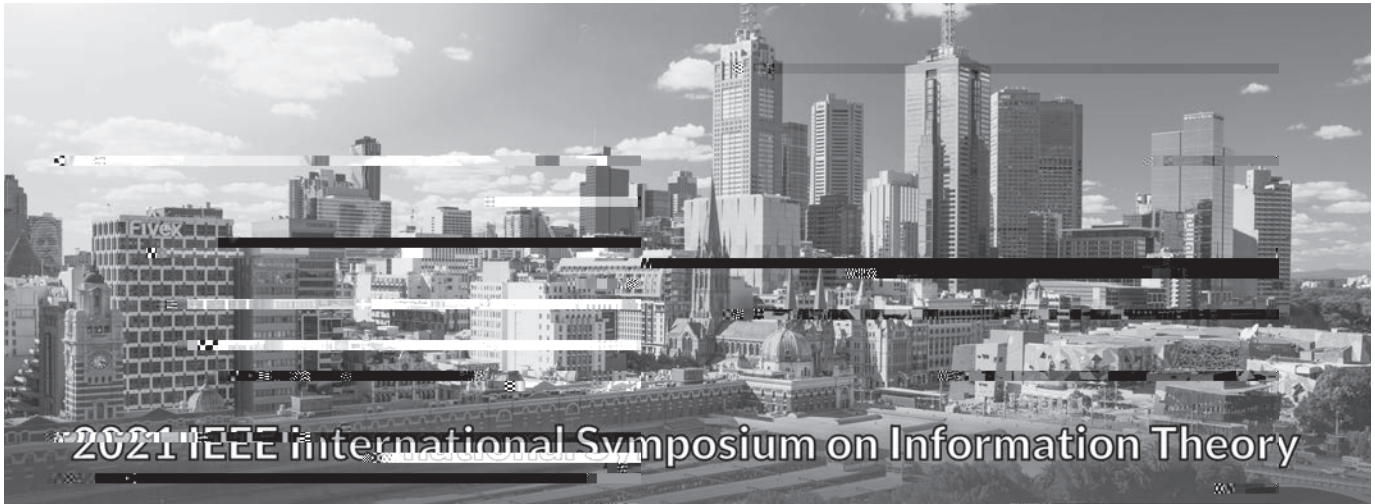**Vol. 66(6): June 2020.**

SHANNON THEORY

*L. W , .-H. K , C.- . C , H. P ,
E. S*

2021 IEEE International Symposium on Information Theory

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General Co-Chairs
Parastoo Sadeghi
Emanuele Viterbo

TPC Co-Chairs
Michael Gastpar
Stephen Hanly
Henry Pfister
Emina Soljanin

Publications
Bikash Dey

Finance
Sarah Johnson

Local Arrangements
Margreta Kuijper
James Saunderson

Publicity
Brian M. Kurkoski

Tutorials
Yi Hong

Recent Results
Neda Aboutorab

Student Travel Grants
Lawrence Ong

Sponsorship
Girish Nair

Fair dinkum, ISIT returns to Australia. In 2021, the IEEE International Symposium on Information Theory (ISIT) will be held 11–16 July at the Melbourne Convention & Exhibition Center in Melbourne, Victoria, Australia. ISIT was last held in Australia in 2005, in Adelaide.

Interested authors are encouraged to submit previously unpublished contributions from a broad range of topics related to information theory, including but not limited to the following areas:

- Communication and Storage Coding
- Coding Theory
- Coded and Distributed Computing
- Combinatorics and Information Theory
- Communication Theory
- Compressed Sensing and Sparsity
- Cryptography and Security
- Detection and Estimation
- Deep Learning for Networks
- Distributed Storage
- Emerging Applications of IT
- Information Theory and Statistics
- Information Theory in Biology

- Information Theory in CS
- Information Theory in Data Science
- Learning Theory
- Network Coding and Applications
- Network Data Analysis
- Network Information Theory
- Pattern Recognition and ML
- Privacy in Information Processing
- Quantum Information Theory
- Shannon Theory
- Signal Processing
- Source Coding and Data Compression
- Wireless Communication

Submitted and published manuscripts should not exceed 5 pages in length plus an optional extra page containing references only. Submitted manuscripts should be of sufficient detail to be evaluated by expert reviewers in the field. Full information about paper submission will be posted on the conference web site.

http://isit2021.org/

Paper submission deadline: January 10, 2021

Notification of acceptance: March 26, 2021

Accepted papers must be presented by an author in person. International attendees wishing to attend ISIT 2021 must be aware of Australian visa requirements. Attendees

2020 Riva del Garda

Call For Papers

Apr 11–15, 2021
Riva Garda (TN) - Italy
www...........020.it

The center of Riva del Garda will fascinate you with its art and architecture, witnessing to ancient history and...
by ancient parkland,
it easily-reachable on-foot

- Technical Program Co-Chairs
Nicolò Cesa-Bianchi (University of Milan, Italy)
Olgica Milenkovic (UIUC)

...and Deep Neural Networks
...ding | and Goo
Learning | tion and
...encies | ptocurre
Biology | Synthetic

The workshop will feature tutorials on interdisciplinary topics of emerging interest. Tutorials will be held on Sunday, April 11

IEEE Information Theory Society

the workshop website: http://www.ita2020.it

Final manuscript and author

TBD

IEEE Journal on Selected Areas in Information Theory

Special Issue on

Conference Calendar

DATE	CONFERENCE	LOCATION	WEB PAGE	DUE DATE
October 24–27,				