Report on

Expert Talk under IEEE Technical Talk Series 2023 and Women in Signal Processing

Expert: Dr. Muriel Medard

April 25th 2023

Title: Guessing Random Additive Noise Decoding (GRAND)- Universal Decoding Algorithm, and Relations to Signal Processing

IEEE Signal Processing Society, Gujarat Section in collaboration with IEEE Silver Oak University SPS SBC, and IEEE CKPCET SPS SBC

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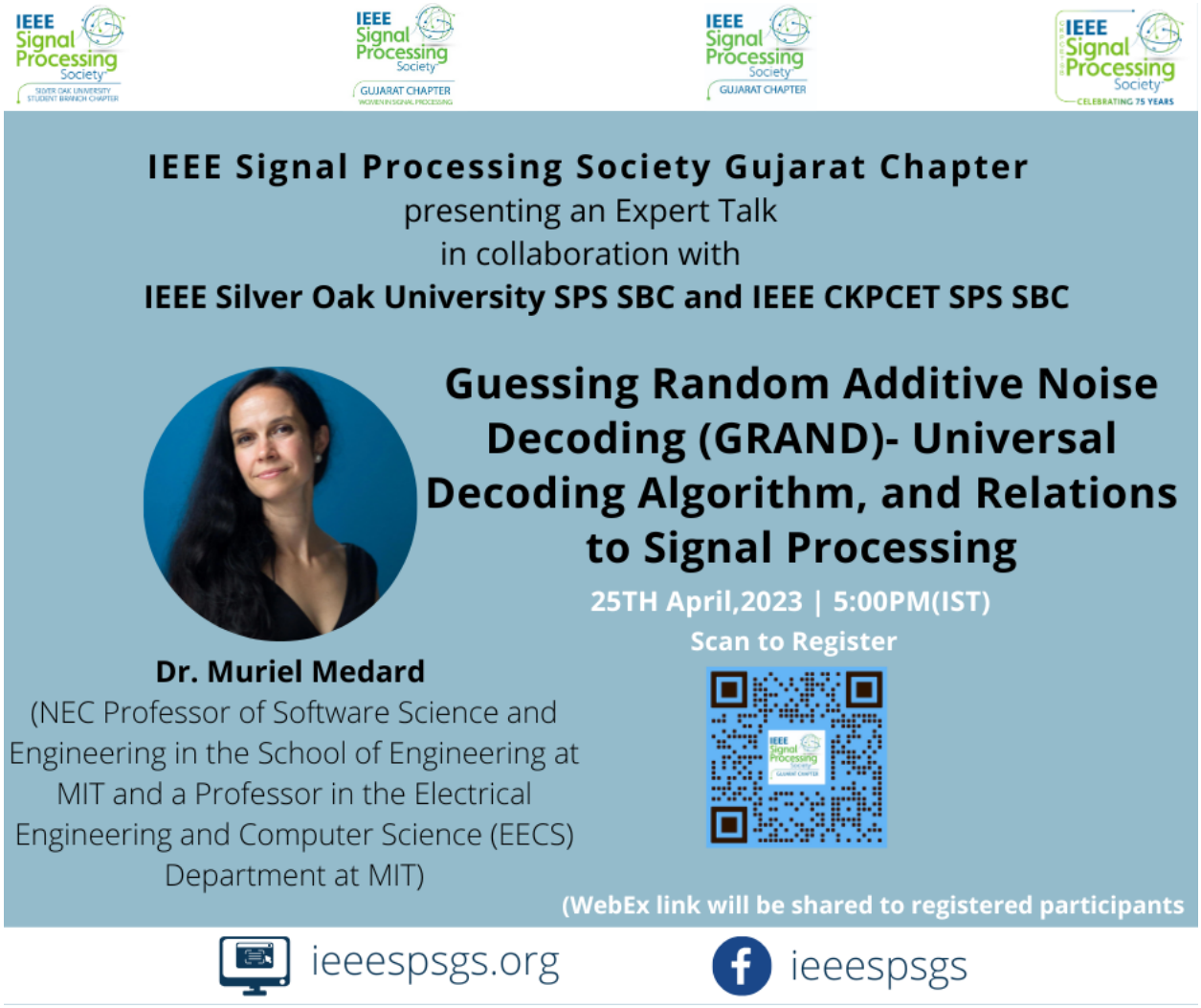
- **Poster for the talk**



- **Expert Profile**

Dr. Muriel Medard

(NEC Professor of Software Science and Engineering in the School of Engineering at MIT and a Professor in the Electrical Engineering and Computer Science (EECS) Department at MIT)

- Muriel Médard is the NEC Professor of Software Science and Engineering in the School of Engineering at MIT and a Professor in the Electrical Engineering and Computer Science (EECS) Department at MIT. She leads the Network Coding and Reliable Communications Group in the Research Laboratory for Electronics at MIT and is Chief Scientist for Steinwurf, which she has co-founded. She obtained three Bachelor's degrees, as well as her M.S. and Sc.D, all from MIT. Muriel is a Member of the US National Academy of Engineering (elected 2020), a Member of the German National Academy of Sciences Leopoldina (elected 2022), a Fellow of the US National Academy of Inventors (elected 2018), American Academy of Arts and Sciences (elected 2021), and a Fellow of the Institute of Electrical and Electronics Engineers (elected 2008). She holds an Honorary doctorate from the Technical University of Munich (2020) and The University of Aalborg (2022).

Muriel was awarded the 2022 IEEE Kobayashi Computers and Communications Award. She received the 2017 IEEE Communications Society Edwin Howard Armstrong Achievement Award and the 2016 IEEE Vehicular Technology James Evans Avant Garde Award. Muriel was co-winner of the MIT 2004 Harold E. Egerton Faculty Achievement Award and was named a Gilbreth Lecturer by the US National Academy of Engineering in 2007.

She received the 2019 Best Paper Award for IEEE Transactions on Network Science and Engineering, the 2018 ACM SIGCOMM Test of Time Paper Award, the 2009 IEEE Communication Society and Information Theory Society Joint Paper Award, the 2009 William R. Bennett Prize in the Field of Communications Networking, the 2002 IEEE Leon K. Kirchmayer Prize Paper Award, as well as nine conference paper awards. Most of her prize papers are co-authored with students from her group.

Muriel currently serves as the Editor-in-Chief of the IEEE Transactions on Information Theory and served previously as Editor in Chief of the IEEE Journal on Selected Areas in Communications. Muriel was elected president of the IEEE Information Theory Society in 2012, and serves on its board of governors, having previously served for eleven years.

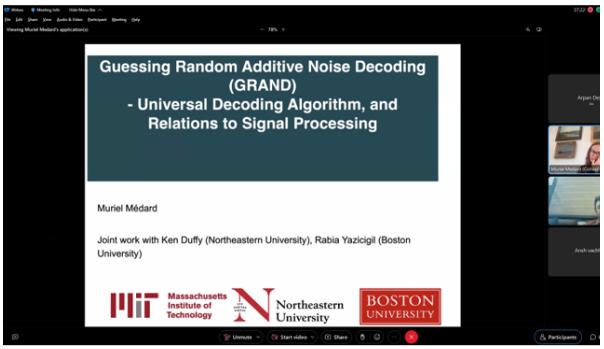
Muriel has supervised over 40 master's students, over 20 doctoral students, and over 25 postdoctoral fellows.

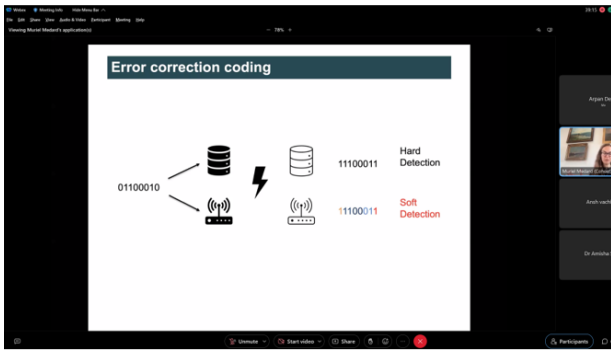
Muriel received the inaugural MIT Postdoctoral Association Mentoring Award in 2022, and the inaugural MIT EECS Graduate Student Association Mentor Award, voted by the students in 2013. She set up the Women in the Information Theory Society (WithITS) and Information Theory Society Mentoring Program, for which she was recognized with the 2017 Aaron Wyner Distinguished Service Award.

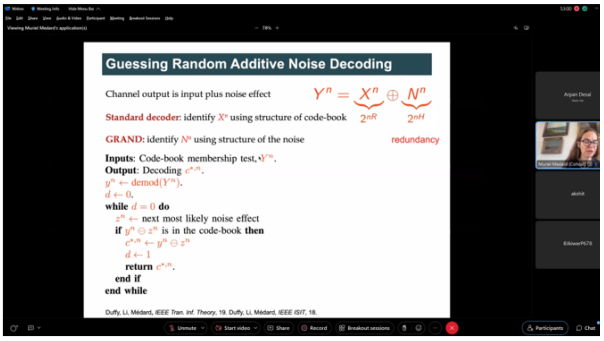
Muriel has over sixty US and international patents awarded, the vast majority of which have been licensed or acquired. For

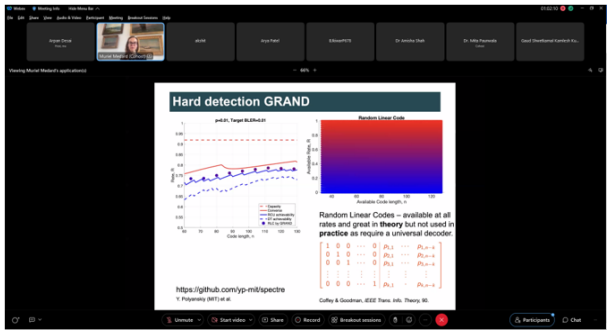
technology transfer, she has co-founded CodeOn, for intellectual property licensing. and Steinwurf, for reliable and low-latency networking. She serves on the Nokia Bell Labs Technical Advisory Board.

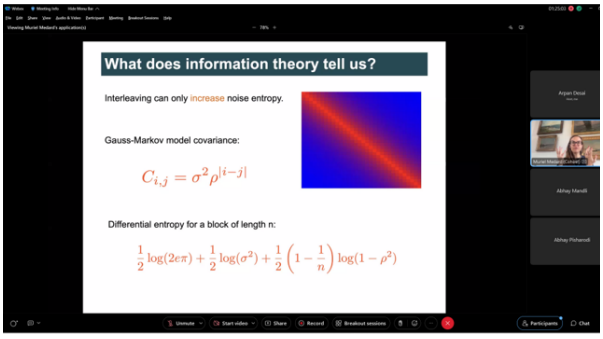
• Glimpses of the Talk










What does information theory tell us?
Interleaving can only increase noise entropy.
Gauss-Markov model covariance:
$C_{i,j} = \sigma^2 \rho^{|i-j|}$
Differential entropy for a block of length n:
$\frac{1}{2}\log(2e\pi) + \frac{1}{2}\log(\sigma^2) + \frac{1}{2}\left(1 - \frac{1}{n}\right)\log(1-\rho^2)$

- **Memento**


Token of Gratitude
Dr. Muriel Medard
NEC Professor of Software Science and Engineering in the School of Engineeing at MIT, Professor in the Electrical Engineering and Computer Science (EECS) Department at MIT
IEEE Signal Processing Society
Dr. Muriel Medard
25-04-2023
For delivering an expert talk on
Guessing Random Additive Noise Decoding (GRAND)
Universal Decoding Algorithm
&
Relations to Signal Processing

- **Number of Participants**

Total: 172

IEEE Members: 84

NON-IEEE Members: 83

Contribution of IEEE SPS SBC:

1. IEEE SPS Silver Oak University SBC: Preparation of e memento and vote of thanks
2. IEEE SPS CKPCET SBC: Preparation of certificate and distribution to participants
3. IEEE WISP Gujarat Chapter: Preparation of poster and feedback form
4. IEEE Gujarat Chapter: Pre, post interaction with speaker and report preparation.

Report Prepared by: Dr. Arpan Desai (Secretary, IEEE SPS Gujarat Chapter)