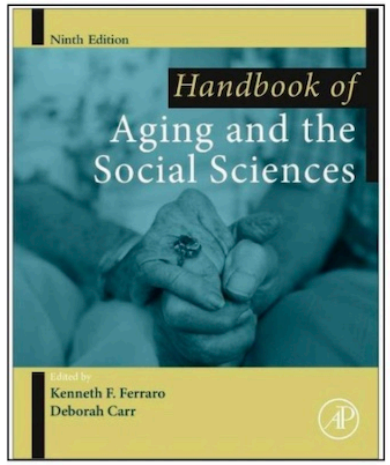
Deborah Carr (CAS/Sociology and Director, Center for Innovation in Social Science)

Editor-in-Chief, 2015-20

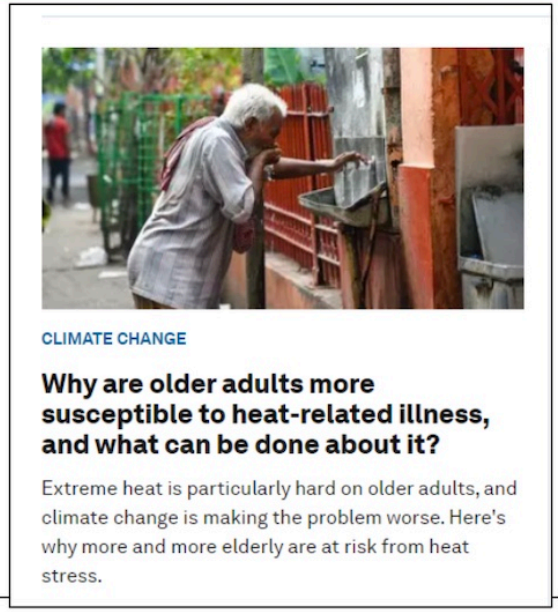
Editor-in-Chief, 2023-26

2019



2021

2023



National Longitudinal Survey of Youth | 1979

NLSY79

PI, 2016-present

The Path to BU

HS in Cranston, RI

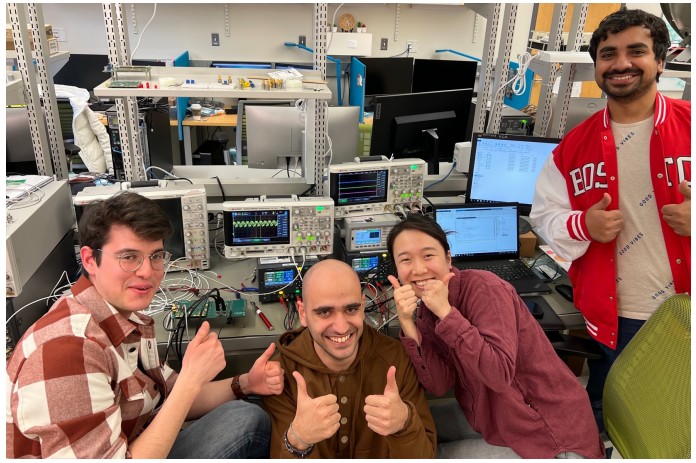
Undergraduate

Detour from academia:
Reporter in NYC

Graduate school

Assistant to full professor jobs……

Wireless **I**ntegrated **S**ystems and **E**xtreme Circuits
WISE-Circuits Group – Prof. Rabia Yazicigil



Energy-efficient ASICs

- Human Health
- Environment
- Sustainability
- Communications

Embrace

Interdisciplinary Collaborations

CYBER-SECURE BIOLOGICAL SYSTEMS

Massachusetts Institute of Technology

BOSTON UNIVERSITY

THE LEONA M. AND HARRY B. HELMSLEY CHARITABLE TRUST

CATALYST FOUNDATION
Bridging science and electrical engineering through cross-disciplinary university-level research

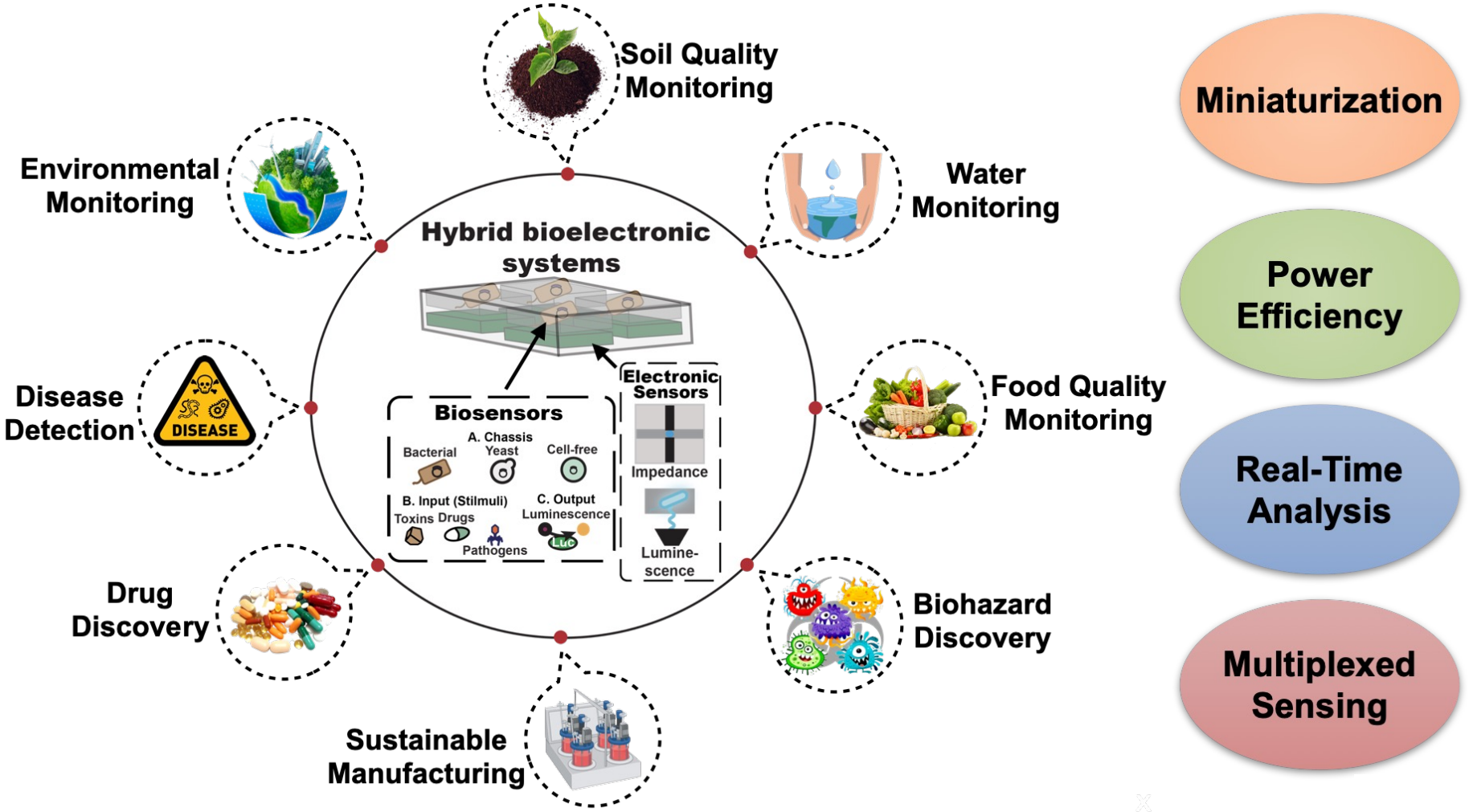
NSF

BioMADE™

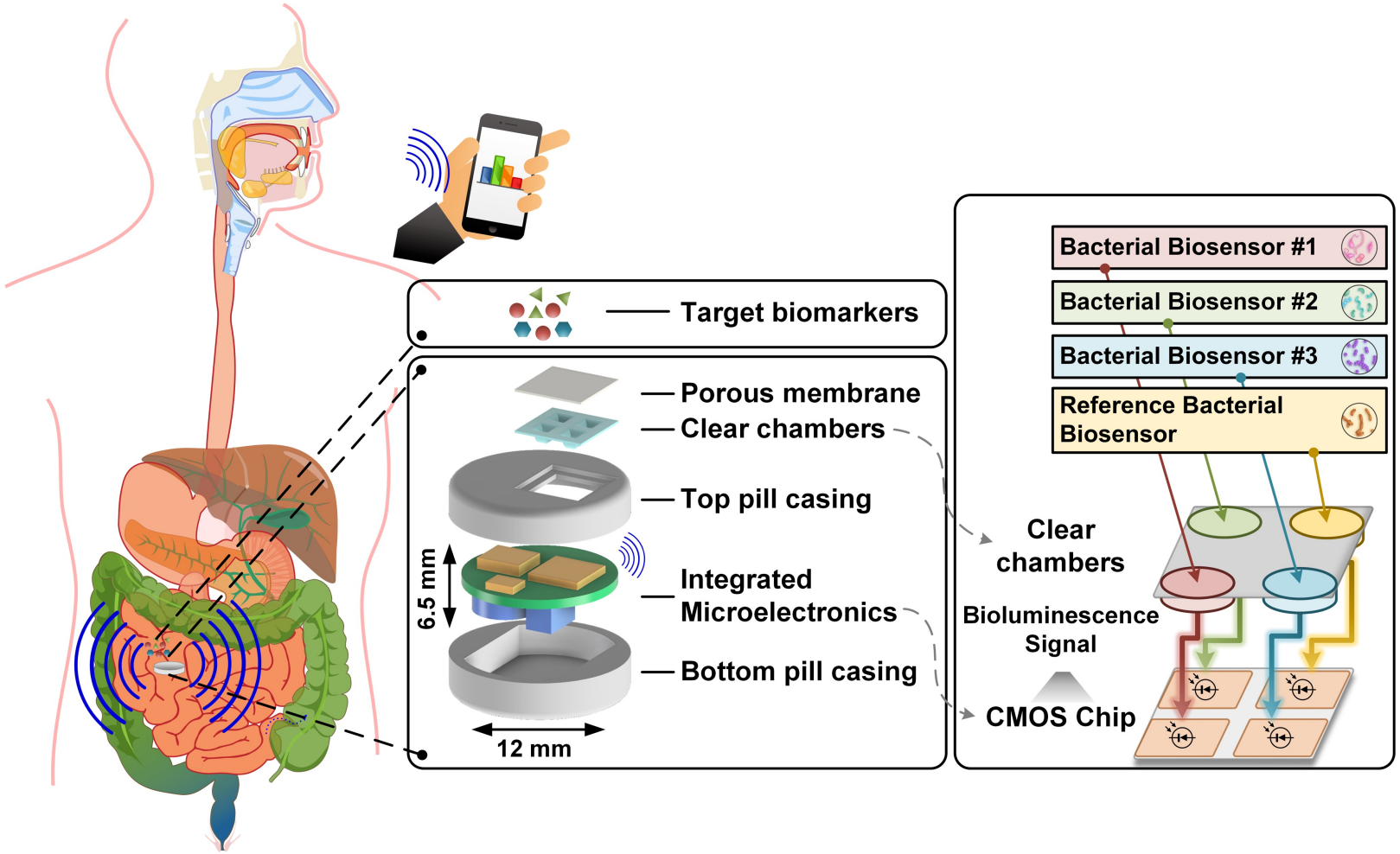
SCHMIDT FUTURES

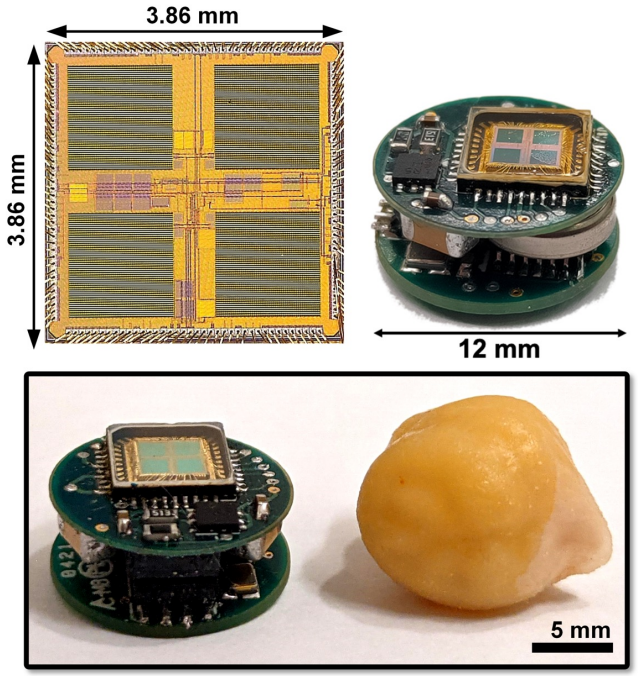
SRC® Semiconductor Research Corporation

Cyber-Secure Biological Systems (CSBS)



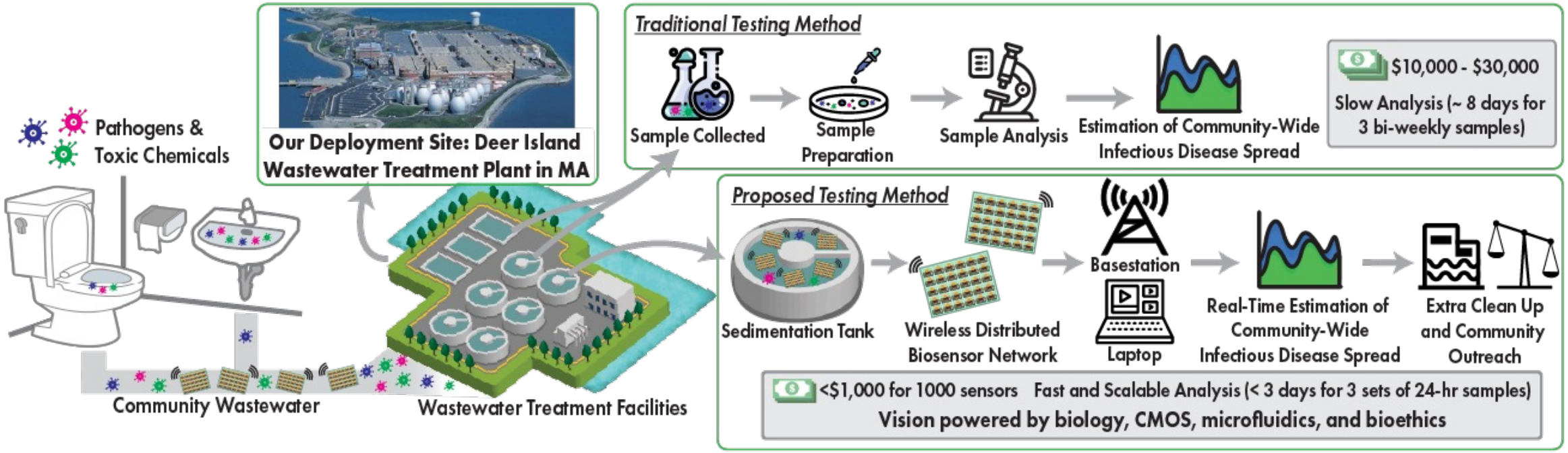
Disease Diagnosis and Monitoring
Synthetic Biology & Hardware Coupling





Q. Liu, et al., "Zero-Crossing-Based Bio-Engineered Sensors," IEEE CICC, 2021.
Q. Liu, et al., "A Threshold-based Bioluminescence Detector with a CMOS-Integrated Photodiode Array in 65 nm for a Multi-Diagnostic Ingestible Capsule," IEEE JSSC, 2023.
M.E. Inda-Webb, M. Jimenez, Q. Liu, et al., "Sub-1.4 cm^3 capsule for detecting labile inflammatory biomarkers in situ," **Nature,** 2023.

Wastewater Surveillance in MA



- **Real-time monitoring** of toxic chemicals & pathogens
- Wireless biosensor network for **distributed** wastewater surveillance
- **Low-cost** detection (<$1000 for 1000 sensors)
- **Fast** & **scalable** analysis (<3 days for 3 sets of 24-hr samples)

Collaborators: Douglas Densmore, Mo Khalil, Wilson Wong – BU

Decode **ANY** code with

GRAND

BOSTON UNIVERSITY

Massachusetts Institute of Technology

NORTHEASTERN UNIVERSITY

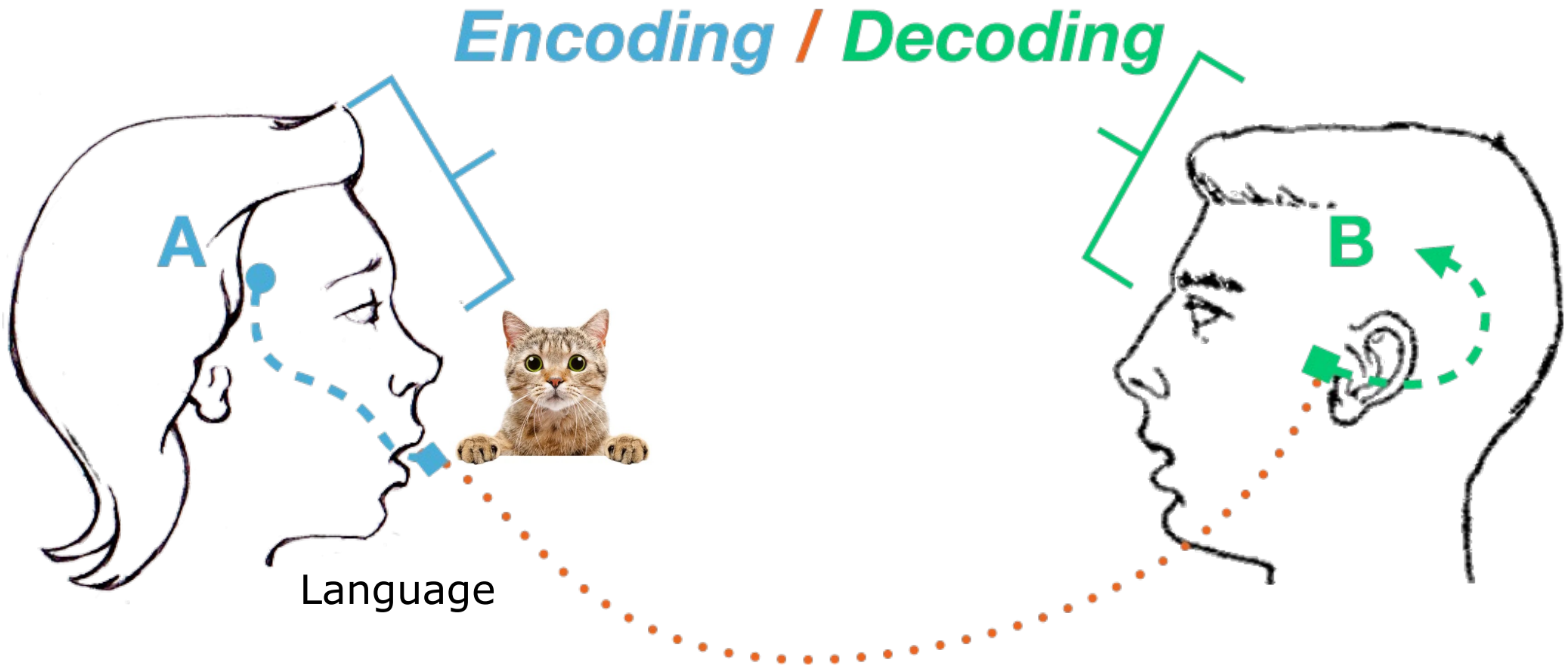
DARPA

NSF

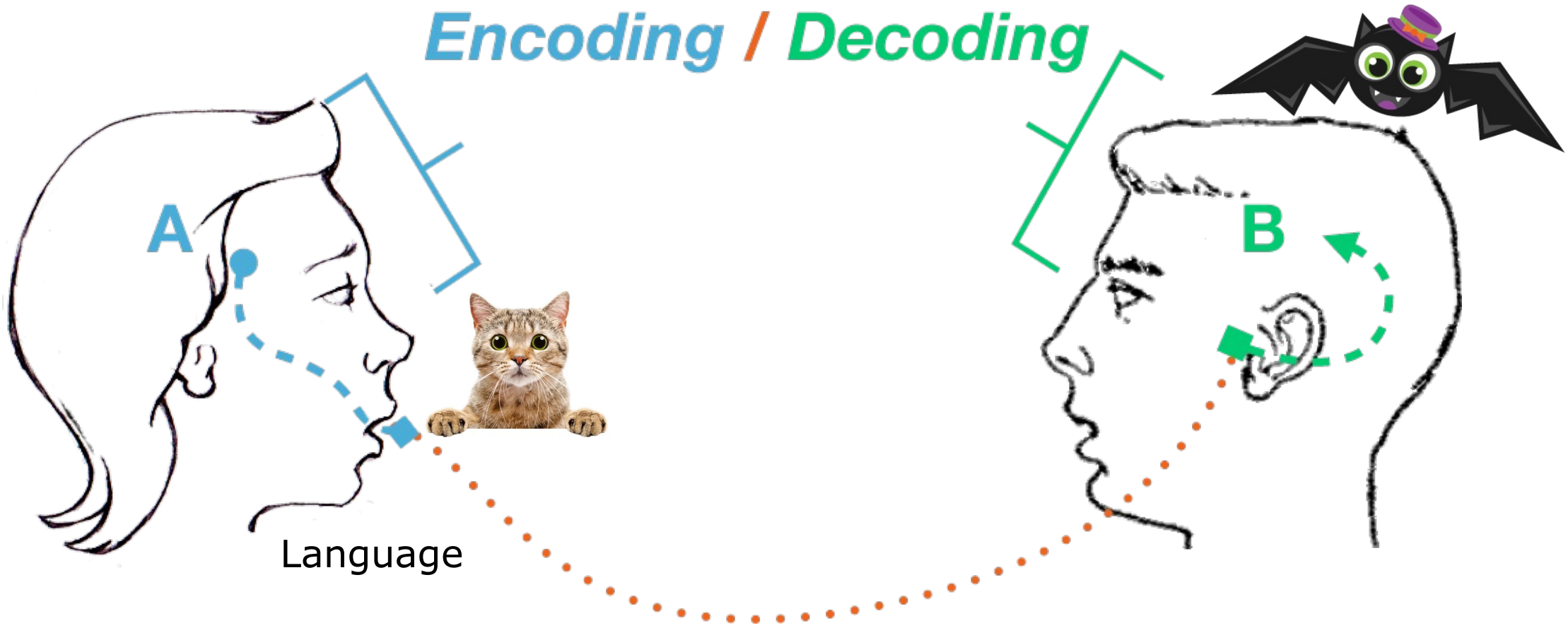
granddecoder.mit.edu

Partially supported by Battelle grant and Science Foundation Ireland.

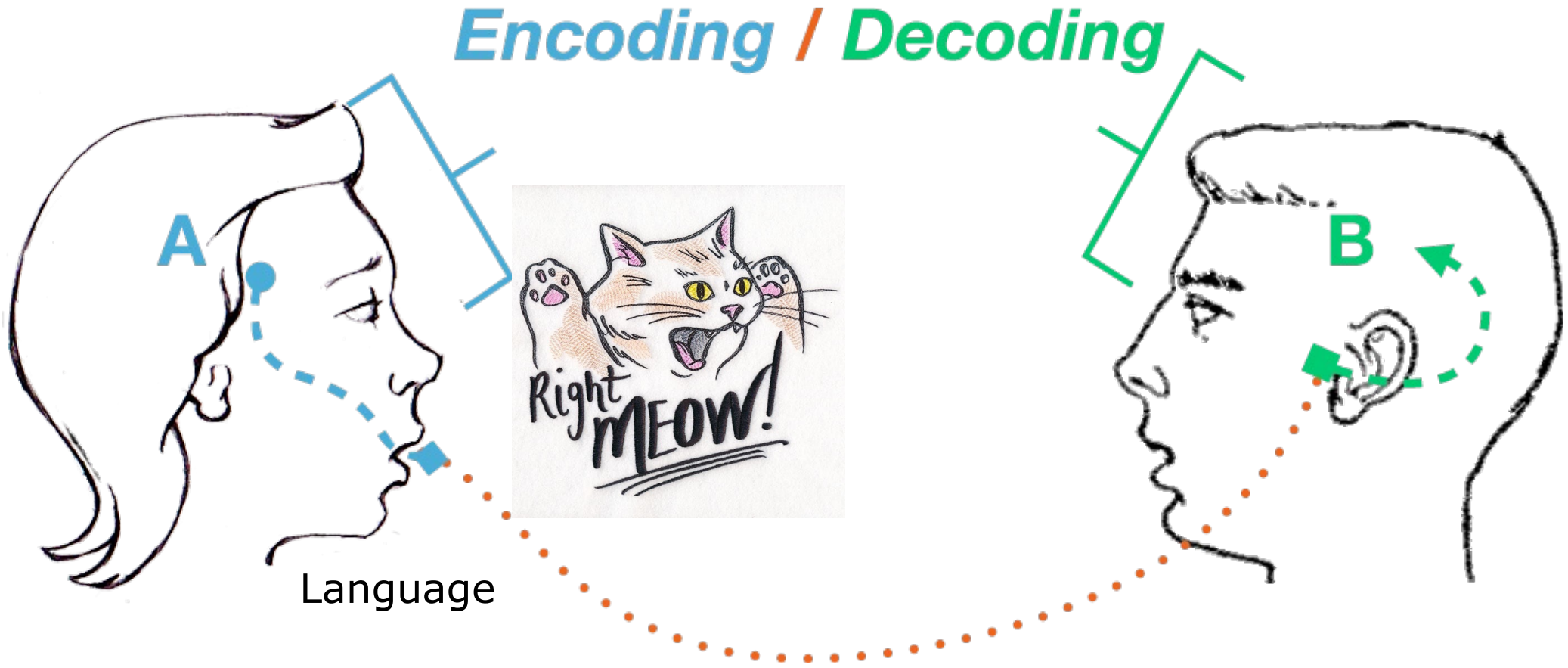
Encoding / Decoding



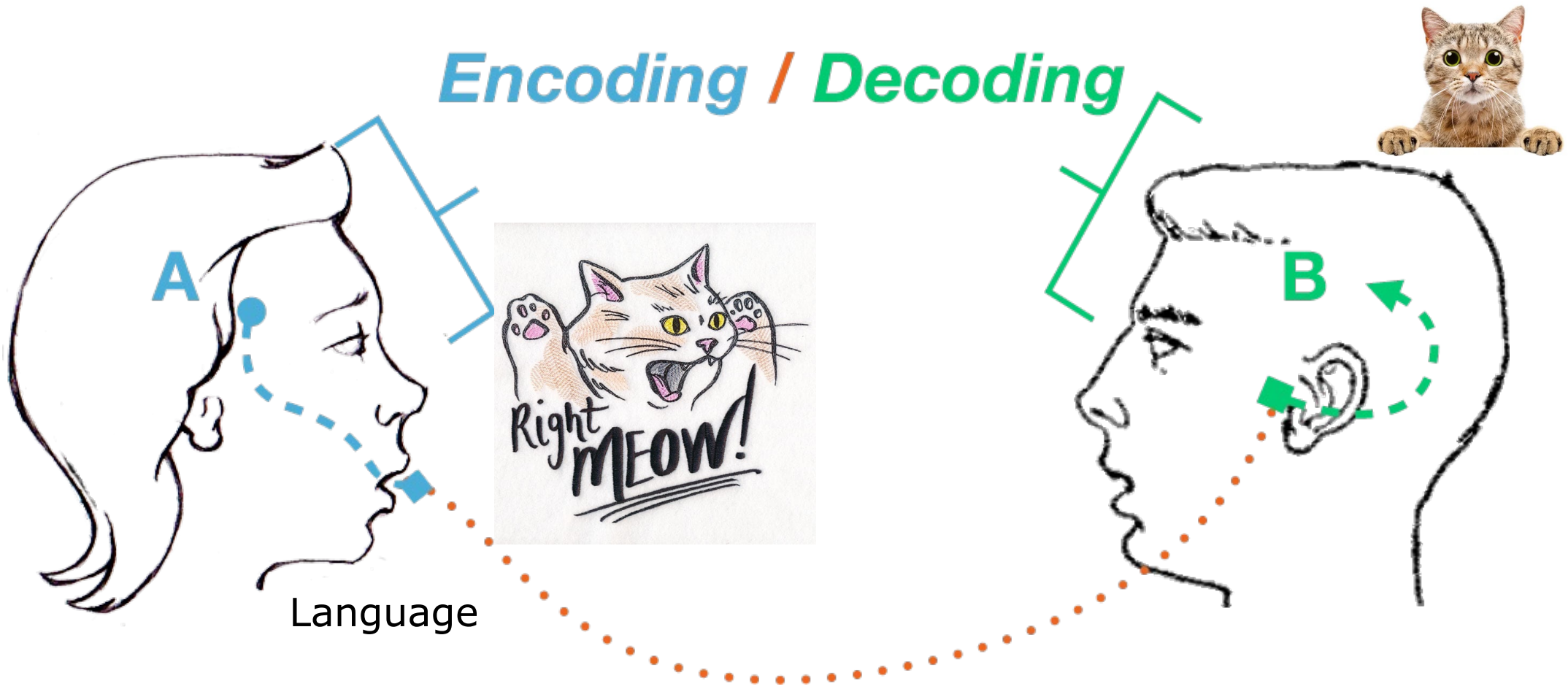
Encoding / Decoding



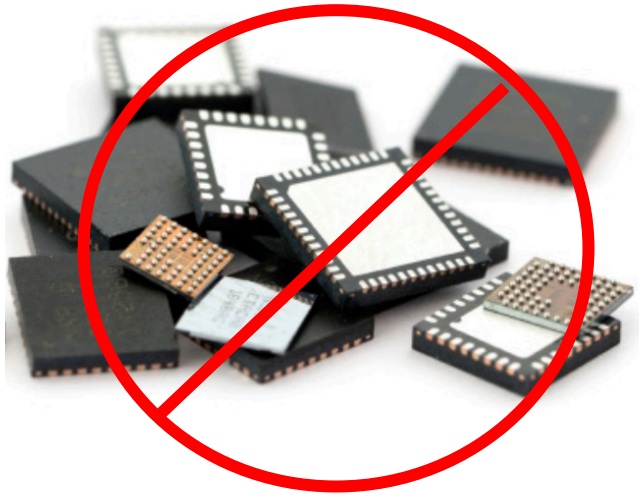
Encoding / Decoding

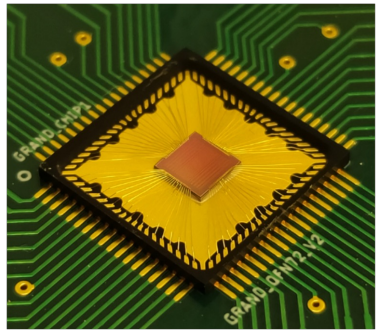


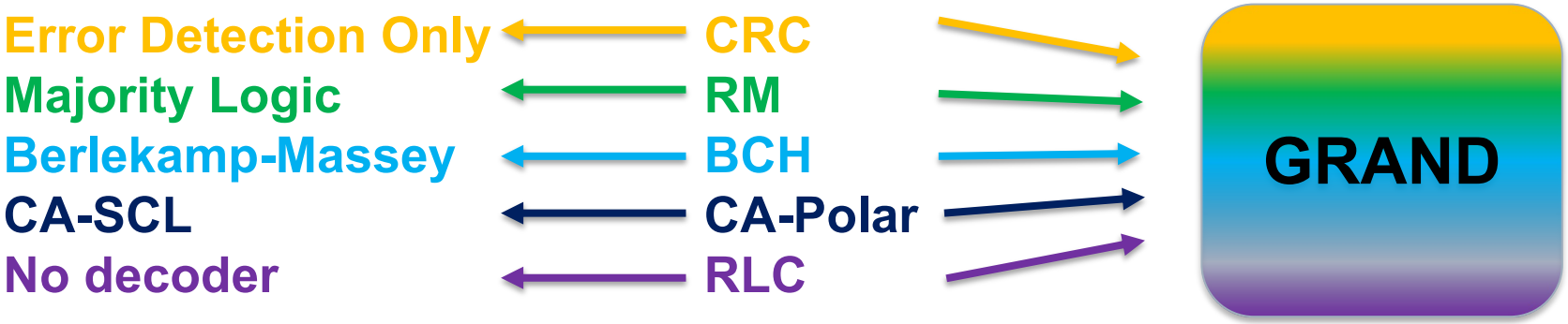
Encoding / Decoding



Universal Decoding of Any Code: GRAND



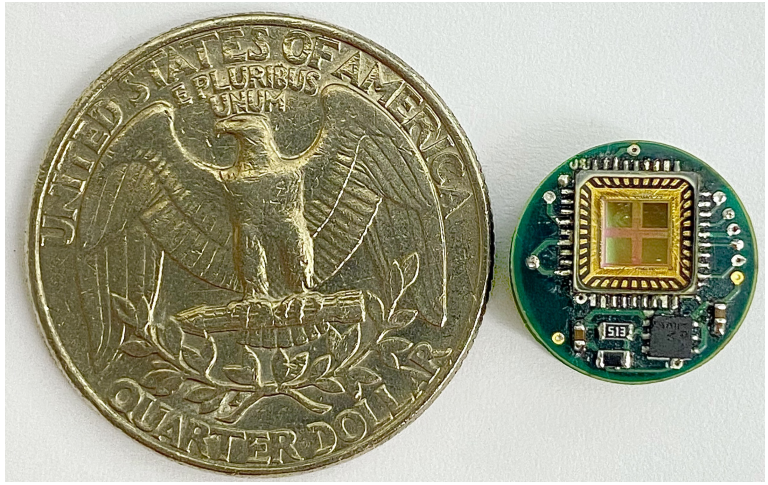




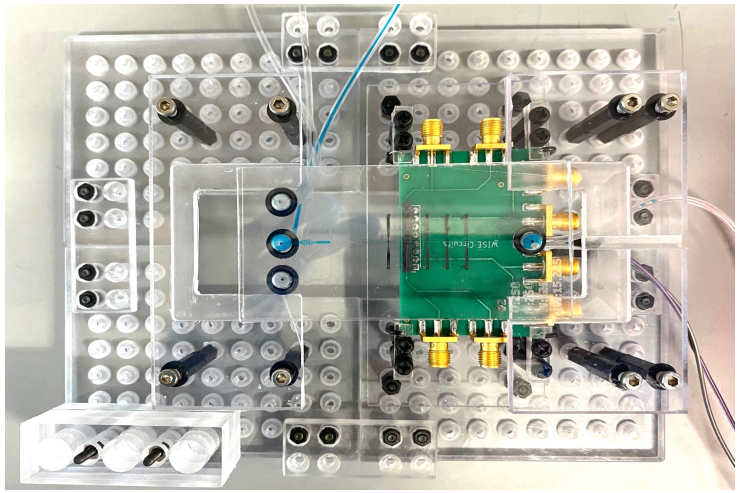
A. Riaz, et al., "A Sub-0.8pJ/b 16.3Gbps/mm2 Universal Soft-Detection Decoder Using ORBGRAND in 40nm CMOS," IEEE ISSCC, 2023.
A. Riaz, et al., "Multi-Code Multi-Rate Universal Maximum Likelihood Decoder using GRAND," IEEE ESSCIRC, 2021.
K. R. Duffy, et al., "Capacity-Achieving Guessing Random Additive Noise Decoding," in *IEEE Trans. on Information Theory,* 2019.

Revisiting WISE-Circuits Research Areas

Cyber-Secure Biological Systems

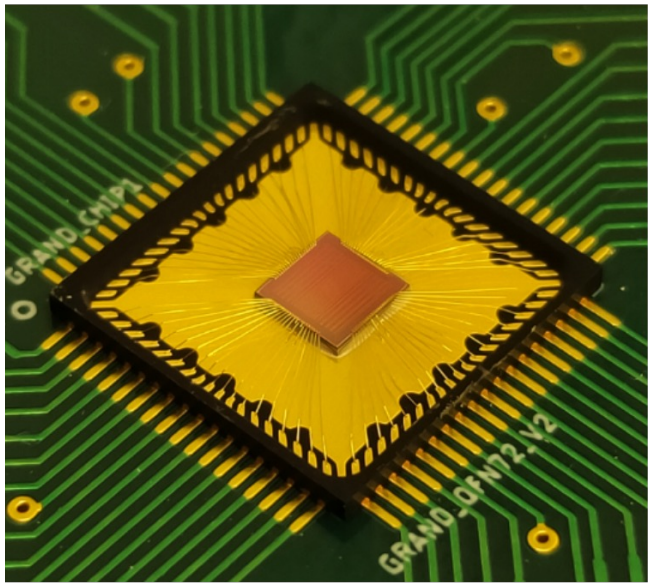


ISSCC SRP'21, CICC'21, BioCAS'22
JSSC'23, **Nature'23**



ISSCC SRP'23 **Best Poster Award**
ISSCC'24

Universal Decoder - GRAND



ISSCC SRP'21, ESSCIRC'21, Globecom'21
ICC'22, FNWF'22, ICC'23
WoWMOM'23, ISIT'23, **ISSCC'23**
COMSNETS'23 **Best Demo Award**
COMSNETS'22 **Best Research Demo Award**

Acknowledgements: WISE-Circuits Group