87th IFIP WG 10.4 Meeting
Praia do Forte, BA, Brazil
February 6 - 10, 2025

Business Meeting

87th WG Meeting – Participants

- 31 participants
  - Asia: 1
  - Europe: 12
  - North America: 5
  - South America: 12
  - Oceania: 1
- 12 members
- 19 guests

Thanks everyone!

Agenda

- DSN 2025, DSN 2026, DSN 2027
- Related Conferences
- JCL Award 2025
- WG Meetings: Summer 2025, Summer 2026

- Second part - restricted to members of the WG!

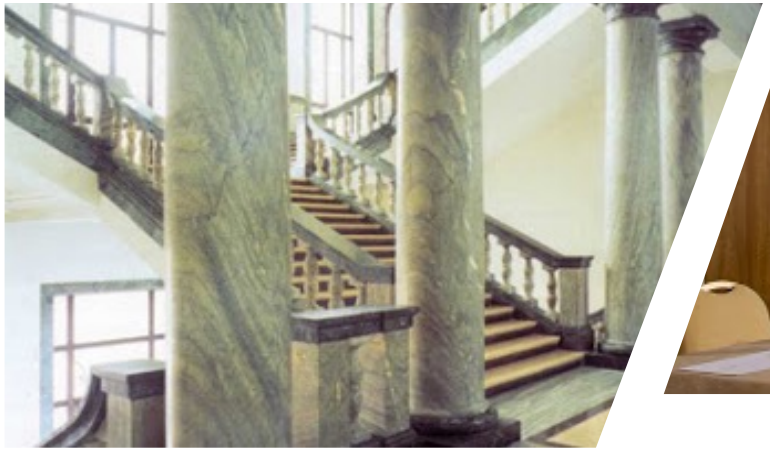
DSN 2025 Naples, Italy

- *Domenico Cotroneo,*
- *Marcello Cinque,*
- *Univ. di Napoli Federico II*


Milan
Verona
Venice
Trieste
Rijeka
Grenoble
Turin
Padua
Croatia
Belgrade
Београд
Pitești
Bosnia and
Herzegovina
Craiova
Parma
Bologna
Genoa
Serbia
Avignon
Zadar
Sarajevo
Montpellier
Monaco
San Marino
Pisa
Niš
Ниш
Split
Mostar
Sofia
София
Marseille
Florence
Makarska
Italy
Montenegro
Kosovo
Adriatic Sea
Podgorica
Подгорица
Pescara
Plovdiv
Пловдив
Corse
North
Macedonia
Rome
Tirana
Ohrid
Охрид
Thessaloniki
Θεσσαλονίκη
Albania
Bari
Olbia
Sassari
Naples
Salerno
Taranto
Brindisi
Alghero
Sorrento
Lecce
Ioannina
Ιωάννινα
Sarandë
Sardegna
Tyrrhenian Sea
Greece
Corfu
Κέρκυρα
Cagliari
Patras
Πάτρα
Athens
Αθήνα
Zakinthos
Ζάκυνθος
Messina
Palermo
Ionian Sea
Trapani
Cefalù
Kalamata
Καλαμάτα
Marsala
Sicilia
Catania
Jijel
جيجل
Tunis
تونس
Syracuse
El Eulma

Dates and travel

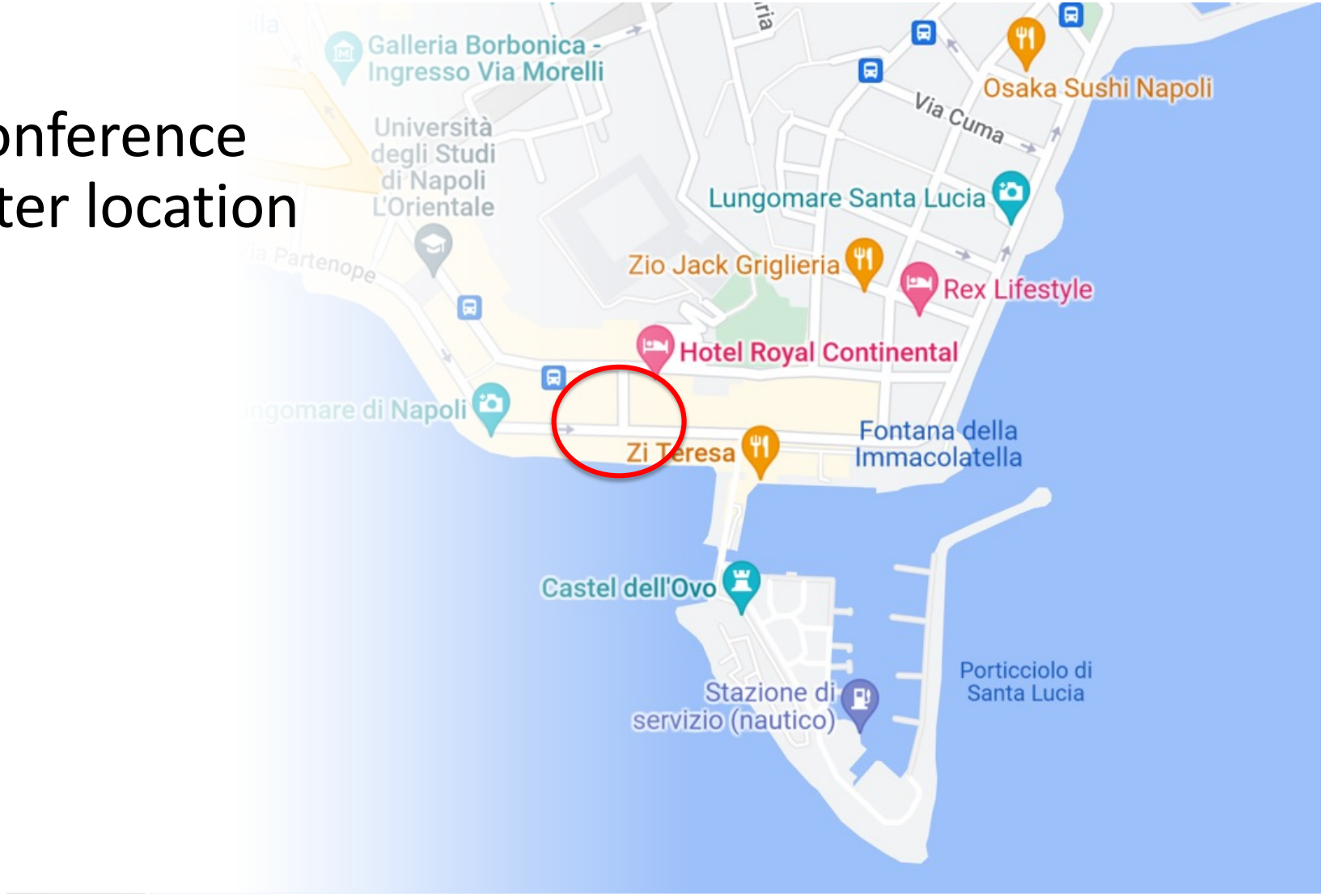
- 23-26 June 2025
- Many flight options to Naples International Airport through New York, Dubai, Rome, London, Paris, Munich, Amsterdam, and many others
- June is summer in Italy, with sunshine and warm weather
  - bring the swimming suit!



Venue: Conference Center Federico II

Lunch & Breaks

Conference Center location



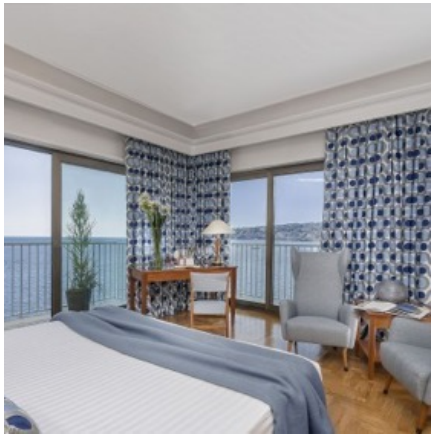
View from the conference center

Places to visit near by…

Excursion and Banquet

Conference Hotel Reservation open

- June is high holiday season in Naples
- Hotel occupancy nears 100%
- We have pre-booked a number of rooms at the Conference's Hotel (**Royal Continental**)
- Hotel reservation is open
  - https://dsn2025.github.io/cvhotel.html
- We recommend to book your room well in advance!



Submissions

- Research Track
  - 280 submissions (Regular: 247; PER: 20; Tool: 13)
    - 37% increase compared to DSN'24
  - Early rejects already sent
  - Final Notifications: March, 19th
- Disrupt Track:
  - 30 abstracts submitted, papers due on Feb, 10th
- Posters:
  - 6 submissions on the first cutoff

Other tracks open for submissions

- Posters
  - 2nd cutoff on march 31st
- Industry
  - March 17 abstracts, March 24 papers
- Doctoral forum
  - March 17
- Tutorials
  - March 8
- Artifacts
  - March 24 (closes after research track notification)

Workshops

- 9 workshops accepted!
  - WDMD - Workshop on Dependability Modeling and Digitalization
  - RTOS - Smart Safe Gateways Running Real-Time Operating Systems
  - VERDI - 3rd Workshop on the Verification & Validation of Dependable Cyber-Physical Systems
  - S2AIM - Safe and Sustainable AI-Aided Manufacturing
  - AxC'25 - The 10th Workshop on Approximate Computing
  - DT4DRS - 1st International Workshop on Digital Twins for Dependability, Resilience and Security
  - FORCE - Foundations Of Reliable Classical-quantum Engineering
  - EnvSys - Workshop on Environment-System Symbiosis
  - DSML - The Eighth Workshop on Dependable and Secure Machine Learning
- Submissions deadline for all workshops: March 31st


See you soon in Napoli!

DSN 2026

Bojan ***Cukic***, Marco ***Vieira***,
Ahmed ***Helmy***

College of Computing and Informatics (***CCI***)
University of North Carolina (UNC) ***Charlotte***

The Dubois Center – UNC Charlotte
bizjournals.com

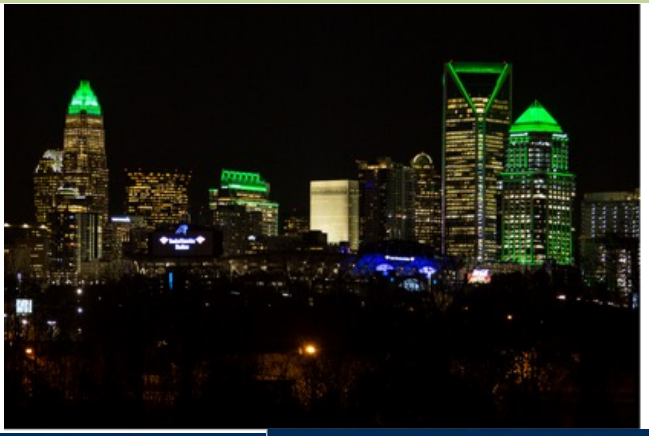
Facts about Charlotte, NC

Large (~1M city, 2.8M region)

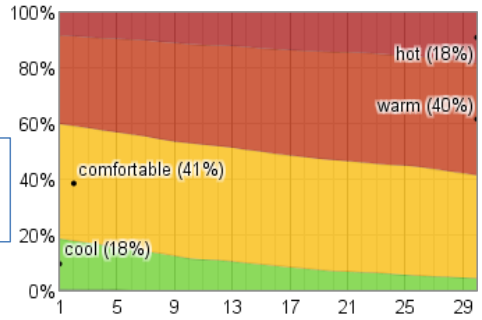
2nd largest banking center in US

Arts, museums, sports scene

Airport hub



66 – 87 °F
19 – 30 °C



June weather

UNIVERSITY OF NORTH CAROLINA
CHARLOTTE
COLLEGE OF COMPUTING AND INFORMATICS
Office of the Dean

The University of North Carolina (UNC) ***Charlotte***

Dubois Center City
Uptown Charlotte

Main Campus

- Urban research (***R1***) university
- 31,000+ students, 170 bachelor's, master's and doctoral programs

College of Computing & Informatics (***CCI***)
Woodward Hall – UNC Charlotte

UNIVERSITY OF NORTH CAROLINA
CHARLOTTE
COLLEGE OF COMPUTING AND INFORMATICS
Office of the Dean


Charlotte is one of the top 10 fastest-rising US niversities
Charlotte is the only public university in NC to rank among US News Most Innovative Schools
BEST COLLEGES
U.S.News
NATIONAL UNIVERSITIES
2025

College of Computing and Informatics (*CCI*)

100+ Faculty & staff
4 departments

1,300+ degrees annually

Enrollment: 5,089
(undergraduate and graduate)

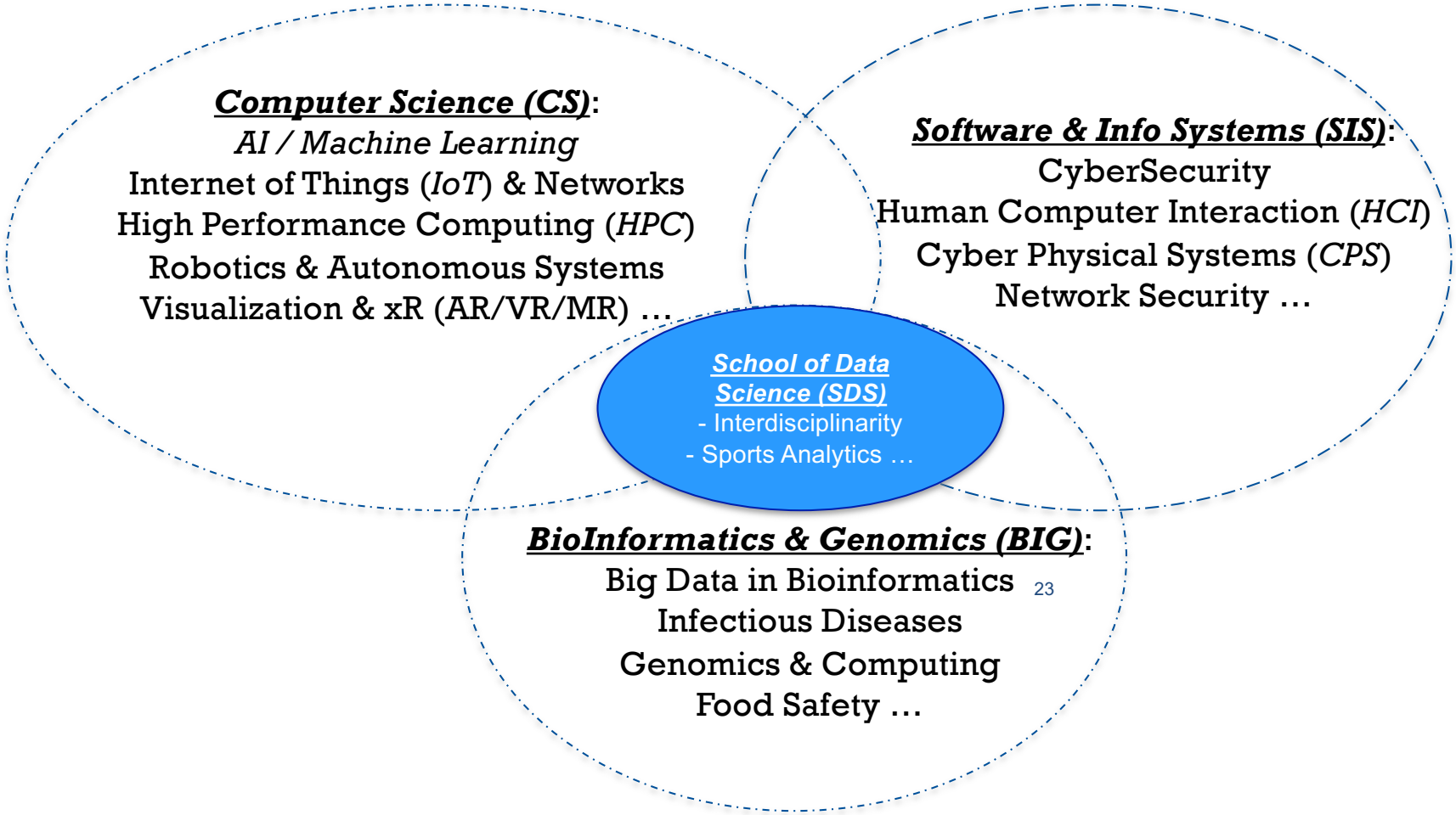
+215% enrollment
+385% graduation
over past decade

1. University of Southern California 2.37%
2. University of California - Berkeley 1.67%
3. University of California - Irvine 1.67%
4. Arizona State University - Tempe 1.59%
5. University of Maryland - College Park 1.56%
6. **University of North Carolina at Charlotte 1.56%**
7. Columbia University in the City of New York 1.55%
8. University of California - San Diego 1.43%

Percentage of Computer Science graduates (BS, BA, MS, PhD) in the US

UNIVERSITY OF NORTH CAROLINA
CHARLOTTE
COLLEGE OF COMPUTING AND INFORMATICS
Office of the Dean

CCI – Research Perspective



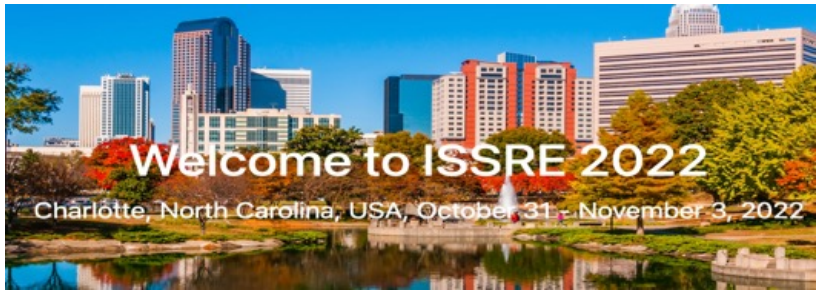
Active CCI Research Centers & Activities: Highlights

- NSF Engineering Research Center (ERC) for Precision Microbiome Engineering (***PreMiEr***)
- *Ignite Pilot* Center: (***AI4Health***) AI for Human Digital Twins & Computational Health
- UNC System (*ROI*) Center for Energy Security and Reliability (***CESAR***) Smart & Reliable Power Grid
- IUCRC Center for Identification Technology Research (***CITeR***)

- *Ignite* Center for Computational Intelligence to Predict Health & Environmental Risks (***CIPHER***)
- *Ignite Pilot* Center for Environmental Monitoring & Informatics Technologies for Public Health (***CEMIT***)

DSN proposal - Background

- Organizational experience:
  - ISSRE 2022
  - SRDS 2024
  - ISADS 2025



- Annual Charlotte Cyber Security Symposium
  - 700+ attendees

GOLD SPONSORS

LOWE'S

Booz | Allen | Hamilton

TITLE SPONSOR

BANK OF AMERICA

SILVER SPONSORS

Allstate. You're in good hands.

RSA

TIAA

BRONZE SPONSORS

WELLS FARGO

MORGANFRANKLIN CONSULTING

CYBERSECURITY SERVICES

signature CONSULTANTS

Checkmarx

UNIVERSITY OF NORTH CAROLINA CHARLOTTE

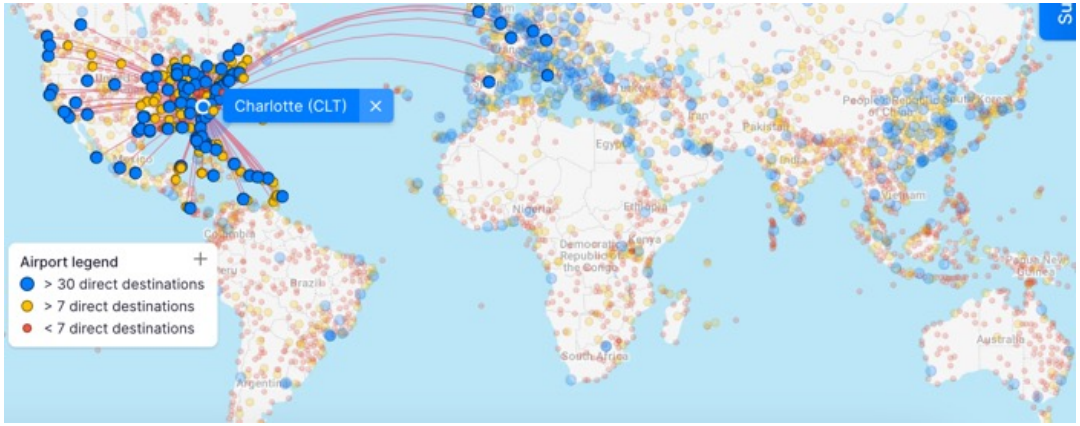
COLLEGE OF COMPUTING AND INFORMATICS

Office of the Dean

Charlotte - Transportation

- Charlotte Douglas Airport
  - 7th-busiest in the world
    - 539,066 takeoffs and landings
    - 53+ million passengers (top 20)
    - 144 US and 44 international destinations

- Light rail connects UNC Charlotte Campus to Uptown



UNIVERSITY OF NORTH CAROLINA CHARLOTTE
COLLEGE OF COMPUTING AND INFORMATICS
Office of the Dean

Organization & Venue

- June 22 – 25, 2026
- Location / Venue
  - UNC Charlotte Center City – Dubois Building
    - Largest room for ~250?
    - Walking everywhere
    - Uptown Charlotte
- Banquet: NASCAR Hall of Fame
- Tour: Mint/Bechtler Museums

UNIVERSITY OF NORTH CAROLINA CHARLOTTE
COLLEGE OF COMPUTING AND INFORMATICS
Office of the Dean

Summary

- Charlotte is easy to reach, safe and pleasant city
  - Strive to organize a moderately priced event
- Significant experience of the organizers
- Support from UNC Charlotte
  - Plan to host the event in Uptown Charlotte campus
  - College of Computing, new positions in trustworthy AI
  - Conference organization support
- …and if you extend your trip, you may see a FIFA World Cup game or two!!!

UNIVERSITY OF NORTH CAROLINA CHARLOTTE
COLLEGE OF COMPUTING AND INFORMATICS
Office of the Dean

CHARLOTTE
COLLEGE OF COMPUTING AND INFORMATICS

Charlotte.edu

Thank you

College of Computing and Informatics (***CCI***): cci.charlotte.edu

DSN 2027

- Berlin, Germany
- General Chair: Katinka Wolter

Related Conferences

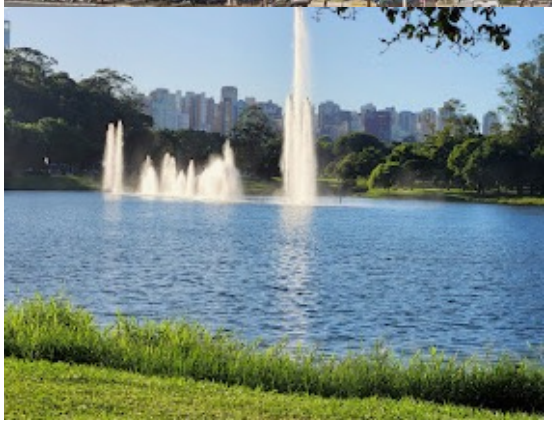
- ISSRE 2025
  - São Paulo, SP, Brazil
  - November 4-7
- EDCC 2025
  - Lisbon, Portugal
  - April 8-11
- SAFECOMP 2025
  - Stockholm, Sweden
  - September 9-12
- PRDC 2025
  - ?
- LADC 2025
  - Valparaíso, Chile
  - October 27-31
- SRDS 2025
  - Porto, Portugal
  - Sep. 30 - Oct. 4

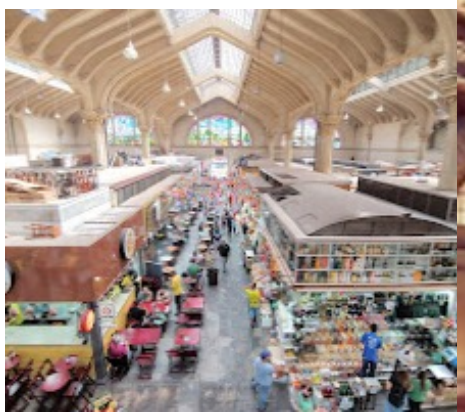
ISSRE 2025
São Paulo, SP, Brazil

Regina Moraes, Andrey Brito

The 36th IEEE International Symposium on Software Reliability Engineering
ISSRE 2025

São Paulo



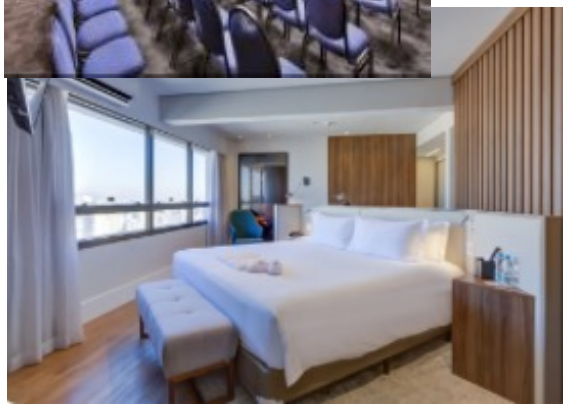


ISSRE 2025 – São Paulo - Brazil

- São Paulo is the **great cultural hub** of South America! There are more than 300 cinemas, 180 theaters, more than 90 cultural centers and 110 museums
- São Paulo is home to some of **the best higher education institutions** in Latin America
- São Paulo is the **world capital of gastronomy**, with more than 10 thousand restaurants and 52 types of cuisine, it is possible to taste typical and delicious dishes from all over the world
- São Paulo is a hub to fly througout Brazilian regions

ISSRE 2025 – São Paulo - Brazil

- Radisson Paulista Hotel will likely be the conference venue



https://www.letsatlantica.com.br/hotel/radisson-paulista?utm_source=gmb&utm_medium=organic&utm_campaign=gmb-rdpa-cta-profile

ISSRE 2025 – São Paulo - Brazil

- **Tracks**
  - Research
  - Industry
  - Fast Abstract
  - Artifact Evaluation
  - Workshops
  - Doctoral Symposium

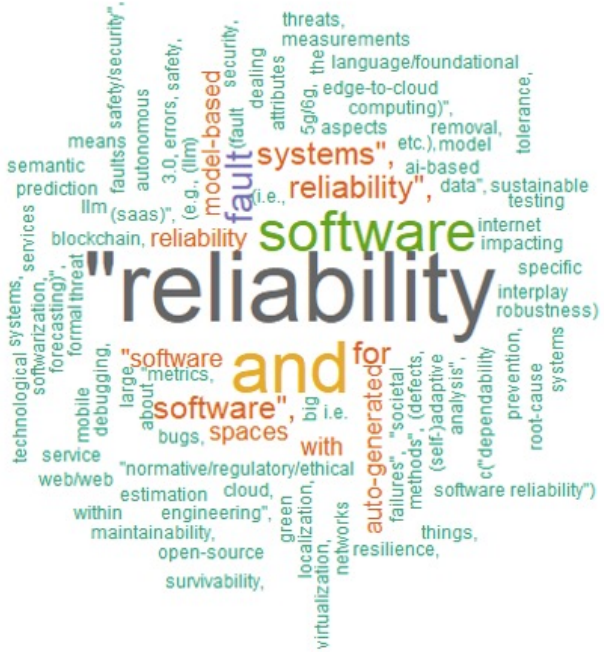
ISSRE 2025 – São Paulo - Brazil

- **Important Dates (Research Track)**
  - Abstract submission deadline: May 5th, 2025
  - Paper submission deadline: May 12th , 2025
  - Early decisions: July 7th , 2025
  - Author rebuttal period: July 7th – July 12th , 2025
  - Notification to authors: July 25th , 2025
  - Camera ready papers: August 26th , 2025

ISSRE 2025 – São Paulo - Brazil

Topics of Interest

- Topics of interest include development, analysis methods and models related to software reliability



ISSRE 2025 – São Paulo - Brazil

https://issre.github.io/2025/

São Paulo City

https://www.youtube.com/watch?v=mXk5-2u0kw0

Thank you

JCL Award 2025

- 6 nominations
- Selection committee being defined
- Decision in April
- Announcement in May

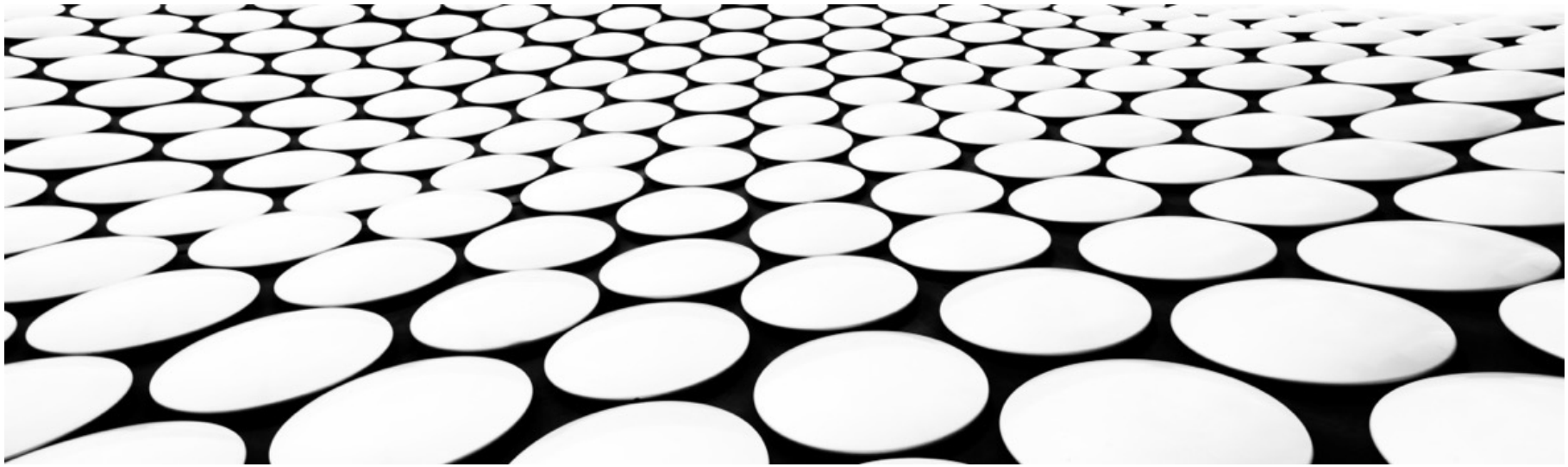
WG Meetings: Locations & Organizers

- Summer 2025 – Naples, Italy (together with DSN 2025)
  - Domenico Cotroneo, Luigi Romano
- Winter 2026 – we have a potential proposal
- Summer 2026 – Charlotte, NC, US (together with DSN 2026)
  - Bojan Cukic, Ahmed Helmy
- Winter 2027 – looking for proposals

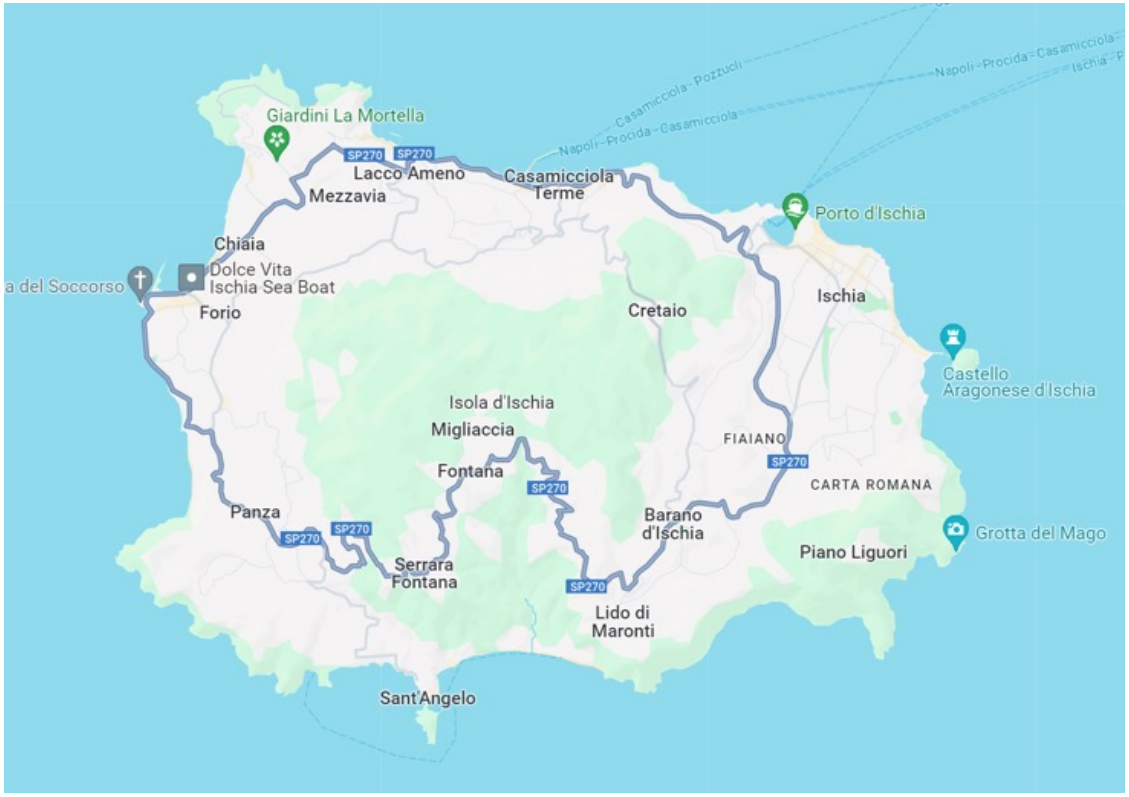
ORGANIZATION OF THE SUMMER 2025 MEETING

DOMENICO COTRONEO AND LUIGI ROMANO

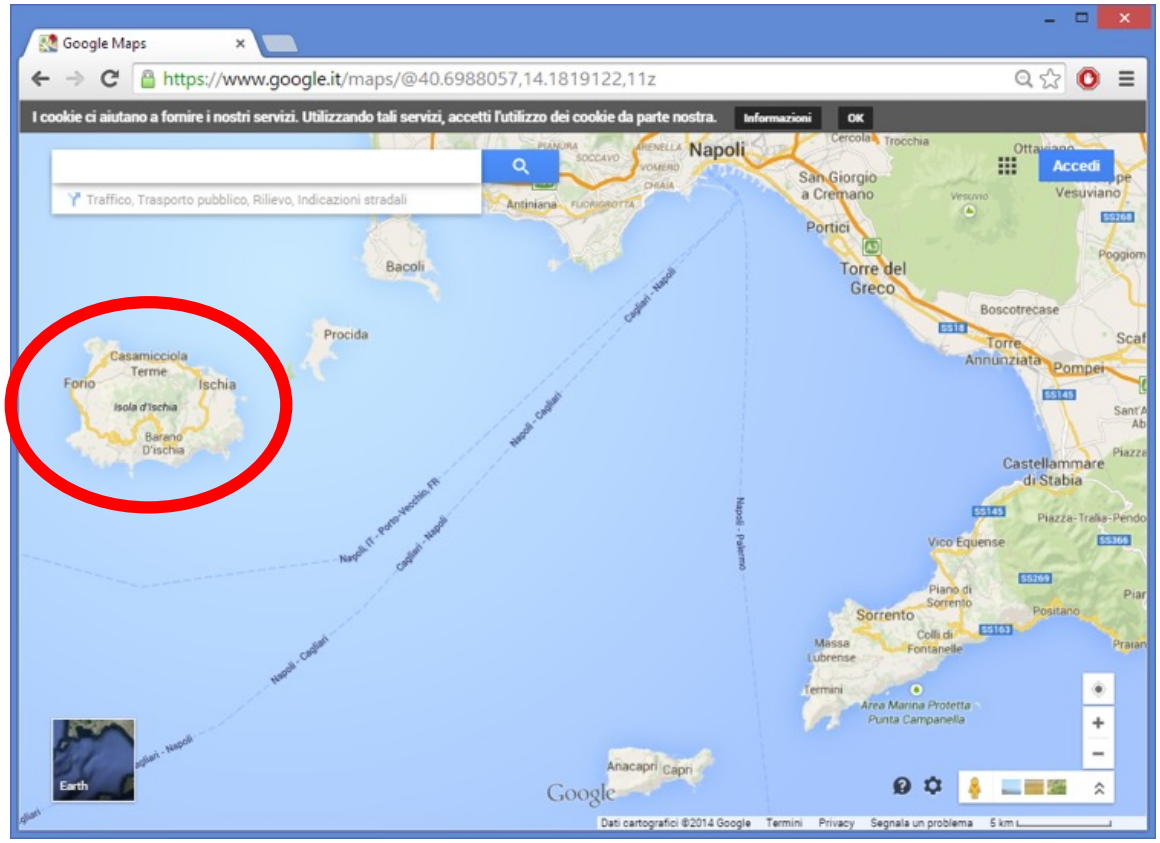
JUNE 26-29, 2025



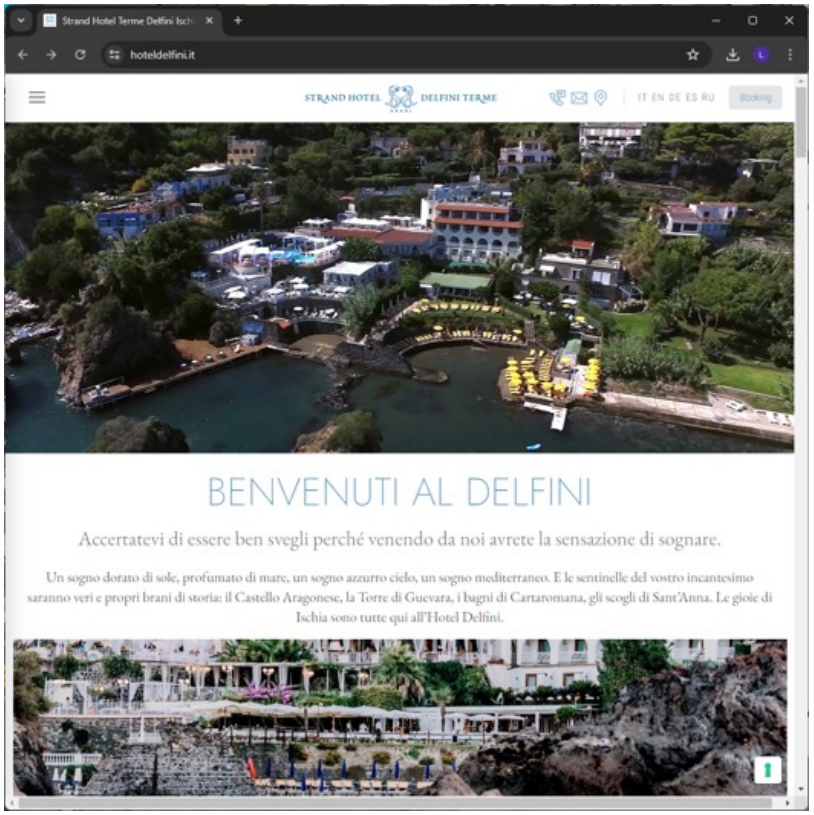
ISCHIA


Giardini La Mortella
SP270
SP270
Lacco Ameno
Mezzavia
Casamicciola Terme
Napoli - Casamicciola - Pozzuoli
Napoli - Procida - Casamicciola
Porto d'Ischia
Chiaia
Dolce Vita
Ischia Sea Boat
Forio
Cretaio
Ischia
Castello Aragonese d'Ischia
Isola d'Ischia
Migliaccio
FIAIANO
SP270
Fontana
SP270
CARTA ROMANA
Panza
SP270
SP270
Barano d'Ischia
Grotta del Mago
Piano Liguori
Serrara Fontana
SP270
Lido di Maronti
Sant'Angelo

ISCHIA: WHERE IT IS



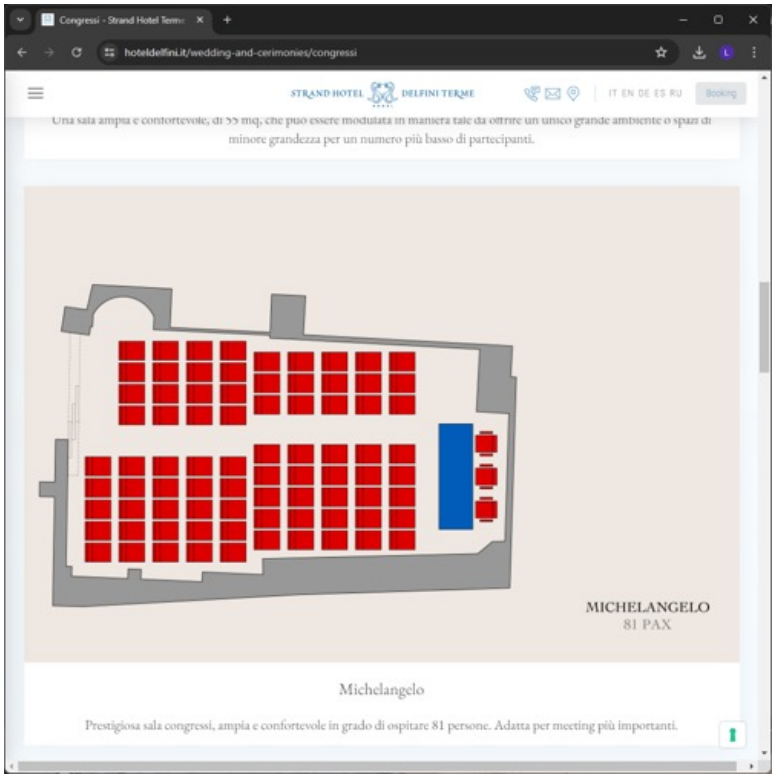
MEETING VENUE: CARTA ROMANA



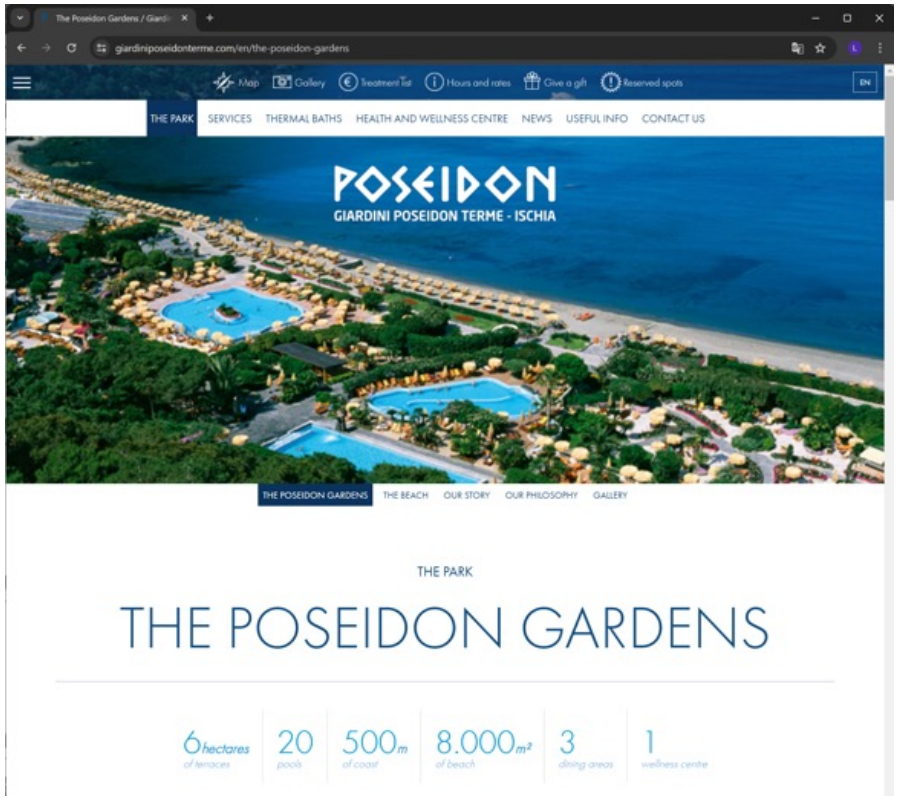
https://www.hoteldelfini.it/

The conference room has 60+ seats

MICHELANGELO MEETING ROOM



EXCURSION


giardiniposeidonterme.com/en/the-poseidon-gardens
Map
Gallery
Treatment list
Hours and rates
Give a gift
Reserved spots
EN
THE PARK
SERVICES
THERMAL BATHS
HEALTH AND WELLNESS CENTRE
NEWS
USEFUL INFO
CONTACT US
POSEIDON
GIARDINI POSEIDON TERME - ISCHIA
THE POSEIDON GARDENS
THE BEACH
OUR STORY
OUR PHILOSOPHY
GALLERY
THE PARK
THE POSEIDON GARDENS
6 hectares
of terraces
20
pools
500 m
of coast
8.000 m²
of beach
3
dining areas
1
wellness centre

SOCIAL EVENT

Dinner at Delfini Hotel

COST

Cost per person: 600 euros

- Includes:
  - Meeting
  - Welcome cocktail
  - Coffee breaks
  - Meeting lunches
  - Social dinner
- Does not include:
  - Lunch on Sunday
  - Dinners
  - Transfer to and from Ischia

BOOKING INFORMATION & RECOMMENDATION

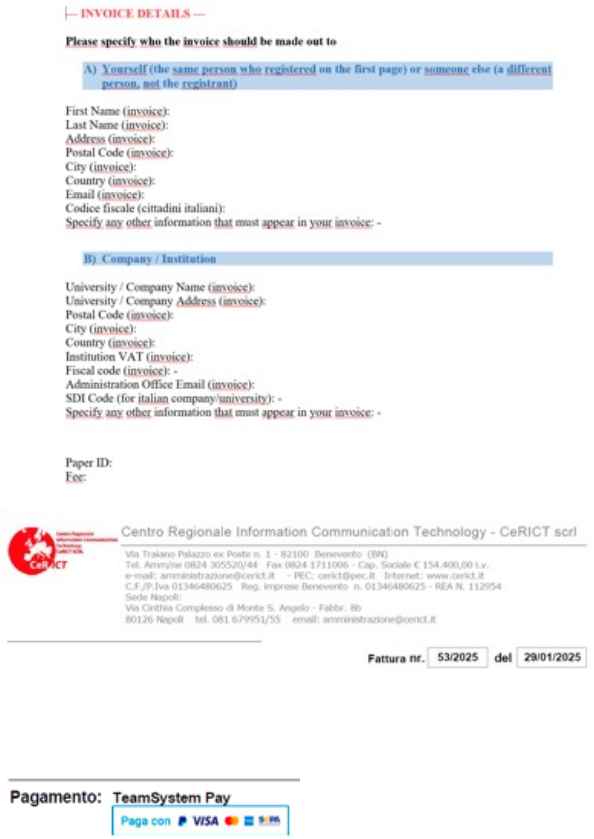
- Ischia is a top touristic target and rooms will not be reserved → Book early (now!)
- Contact the hotel and mention that you are participating in the IFIP meeting, organized by CeRICT. This will give you a 5% discount (10% in case of a double room for single occupancy)
- Breakfast is included
- You will have to provide credit card info to secure your reservation

AGENDA AND LOGISTICS INFORMATION

- A preliminary agenda is already available (and has been circulated)
- It contains the schedule for the sessions, the breaks, the social dinner and the excursion
- The speakers have not been included yet
- Information about how to reach Ischia has also been circulated
- This information will be updated in the next months and recirculated

REGISTRATION PROCESS: ADMIN INFO FOR PAYMENT

1. Please, fill out the doc template with your info (we will circulate it)
2. email it to: **ifip2025@cerict.it** (cc: valentina.poddighe@uniparthenope.it)
3. You will receive an email with a secure link for the payment
4. You pay
5. You have been registered ☺



— INVOICE DETAILS —

Please specify who the invoice should be made out to

A) Yourself (the same person who registered on the first page) or someone else (a different person, not the registrant)

First Name (invoice):
Last Name (invoice):
Address (invoice):
Postal Code (invoice):
City (invoice):
Country (invoice):
Email (invoice):
Codice fiscale (cittadini italiani):
Specify any other information that must appear in your invoice: -

B) Company / Institution

University / Company Name (invoice):
University / Company Address (invoice):
Postal Code (invoice):
City (invoice):
Country (invoice):
Institution VAT (invoice):
Fiscal code (invoice): -
Administration Office Email (invoice):
SDI Code (for italian company/university): -
Specify any other information that must appear in your invoice: -

Paper ID:
Fee:

Centro Regionale Information Communication Technology - CeRICT scrl

Via Traiano Palazzo ex Poste n. 1 - 82100 Benevento (BN)
Tel. Amm/ne 0824 305520/44 Fax 0824 1711006 - Cap. Sociale € 154.400,00 i.v.
e-mail: amministrazione@cerict.it - PEC: cerict@pec.it Internet: www.cerict.it
C.F./P.Iva 01346480625 Reg. Imprese Benevento n. 01346480625 - REA N. 112954
Sede Napoli:
Via Cinthia Complesso di Monte S. Angelo - Fabbr. 8b
80126 Napoli tel. 081 679951/55 email: amministrazione@cerict.it

Fattura nr. 53/2025 del 29/01/2025

Pagamento: TeamSystem Pay

Paga con VISA

88th IFIP WG10.4 Meeting – 26-29 June, Ischia, Naples

Workshop Topic: **Cybersecurity of Transportation Systems**

Andrea Ceccarelli
University of Florence
Italy

Wilfried Steiner
TTTech
Austria

Marcus Völp
University of Luxembourg
Luxemburg

The relevance of software in transportation systems and the related infrastructure is constantly growing. Unavoidably, cyber-security is an increasing concern. [...] discuss and compare the current status and cybersecurity challenges in the different transportation industries (including risk assessment, threat and attack modelling, and vulnerability management).

Talks are expected answering (some of) the following subjects:

- Industrial case studies of cybersecurity in transportation systems and products.
- Hardware/software co-design for cybersecurity.
- What cybersecurity actions are required in the transportation infrastructure and are there trade-offs between the infrastructure and the vehicle.
- Cybersecurity open issues today and upcoming challenges.
- Socio-technical and legal aspects of cybersecurity in the transportation industry.
- Growing demand of wireless safety-critical and real-time communication and its implications on cybersecurity

Our idea of the program

- 8-10 speakers

- Divided on
  - Automotive
  - Railway
  - Aerospace
  - Laws and socio-technical issues

Recommendations on speakers are welcome especially on **railway and aerospace**

IFIP WG 10.4 Winter 2026

Potential proposal: Macau

Looking into alternatives: e.g., Japan, Florida/USA, Puerto Rico, Corsica/France, Caribbeans… open to suggestions ☺

The Dubois Center – UNC Charlotte
bizjournals.com

Bojan ***Cukic***, Marco ***Vieira***,
Ahmed ***Helmy***

College of Computing and Informatics (***CCI***)
University of North Carolina (UNC) ***Charlotte***

Proposed Themes & Topics Options

- Smart Grid Security, issues with
  - grid infrastructure,
  - connectivity & network infrastructure,
  - cyber-physical systems (CPS),
  - cyber-social systems
  - natural/human-made disasters
- Identity Security, issues with
  - identification, thru biometrics, etc.
  - liveness,
  - deep fakes

The Dubois Center
UNC Charlotte

UNIVERSITY OF NORTH CAROLINA
CHARLOTTE

Proposed Themes: Smart Grid Security

- Power Grid Security
  - critical infrastructure security in the power grid
  - increasing convergence of power grid systems and the Internet
    - Internet of Things [IoT], Cyber Physical Systems [CPS]
  - maintaining reliability and security at ***scale***
  - emerging trends in securing grid control systems against cyber-attacks

- Cybersecurity & Critical Infrastructure
  - cybersecurity in power grid protection
  - threats to Supervisory Control and Data Acquisition (SCADA) and grid control systems (e.g., ransomware, advanced persistent threats)
  - case studies of recent cyber-attacks on power grids
  - best practices for defending against cyber threats in grid systems
  - Securing comm. between IoT devices, substations, and control centers

Proposed Themes: Smart Grid Security

- Cyber Physical Systems (CPS) & Internet of Things (IoT)
  - Vulnerabilities & risks in CPS used for power grid operation
  - Design principles for resilient CPS in critical infrastructure
  - Mitigating risks of physical damage from cyber incidents
  - Secure architectures for distributed grid systems and ***edge*** computing
  - Techniques for modeling and simulating CPS failure scenarios

- Cyber & Physical Systems Interactions in Crisis
  - interdependencies between cyber and physical systems during ***disasters***
  - cascading failures from cyber-physical attack scenarios (e.g., blackouts, system failures)
  - resilience modeling & fault tolerance in integrated power & comm systems
  - restoring operations after large-scale failures
  - ***automation*** in grid recovery and ***self-healing*** capabilities

Proposed Themes: Smart Grid Security

- Social Behavior & Crowd Dynamics in Power Grid Resilience
  - Impact of abnormal behavior (flash crowds, panic) on grid operations
  - Modeling crowd behavior in disaster scenarios and its impact on infrastructure demand
  - Predictive analytics for understanding human behavior in crisis situations
  - Integrating social data (e.g., social media) into disaster response strategies
  - Coordinating human and machine behavior for improved resilience

Proposed Themes: Smart Grid Security

- Resilience to Natural and Human-Made ***Disasters***
  - power grid & ***natural*** disasters (e.g., hurricanes, earthquakes, wildfires)
  - protection against ***man-made*** disasters (e.g., terrorism, arson, misinfo)
  - long-term resilience : Preparing for & recovering from extreme events
  - case studies on grid resilience during large-scale disasters (e.g., Puerto Rico post-Maria)
  - policy frameworks for disaster preparedness in critical infrastructure

- **AI & Machine Learning (ML)** in Securing the Power Grid
  - ***anomaly detection*** and threat response in power grid networks
  - Automated grid mgmt and self-healing through ***predictive modeling***
  - AI-driven decision-making for cybersecurity in CPS
  - data privacy and integrity in AI-driven systems
  - Future AI/ML in anticipating and mitigating large-scale threats

Vision: Making North Carolina a National and Global leader in Energy Security & Reliability

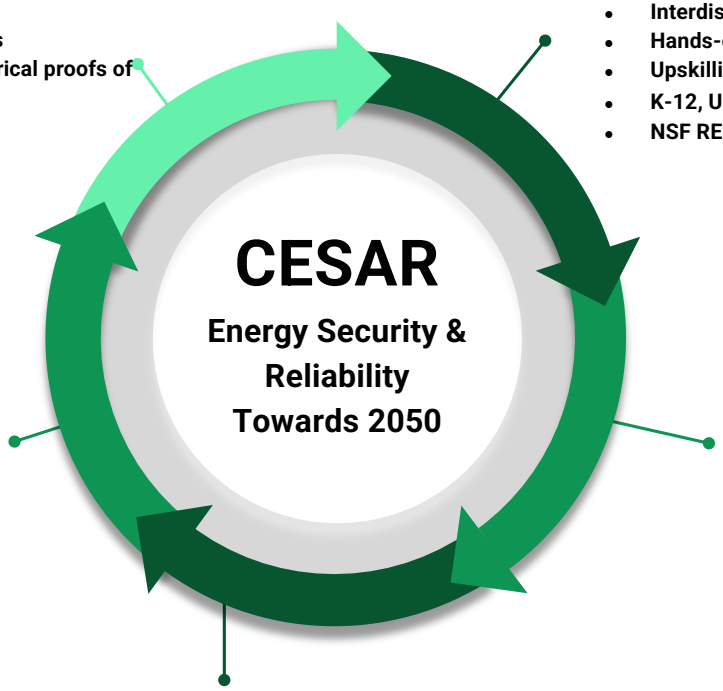
CUTTING-EDGE RESEARCH

- World-class IT/OT T/D/DER testbeds
- Advanced attacks & defenses (empirical proofs of vulnerability)
- Interdisciplinary experts

EDUCATION & WORKFORCE DEVELOPMENT

- Interdisciplinary Certificates
- Hands-on training materials / stackable modules
- Upskilling / reskilling for NC workforce competitiveness
- K-12, UG / MS / PhD Research
- NSF REU, NSA research traineeships

Mission:



STATE-OF-THE-ART FACILITIES

- EPIC Smart Grid Lab
- EPIC Flex Lab
- CCI SmartHome Lab

INDUSTRY & GOVERNMENT PARTNERSHIPS

- Industry Advisory Board
- DoE, DoE Labs
- National Security Agency

CENTER FOR ENERGY

UNIVERSITY OF NORTH CAROLINA CHARLOTTE

NC STATE UNIVERSITY

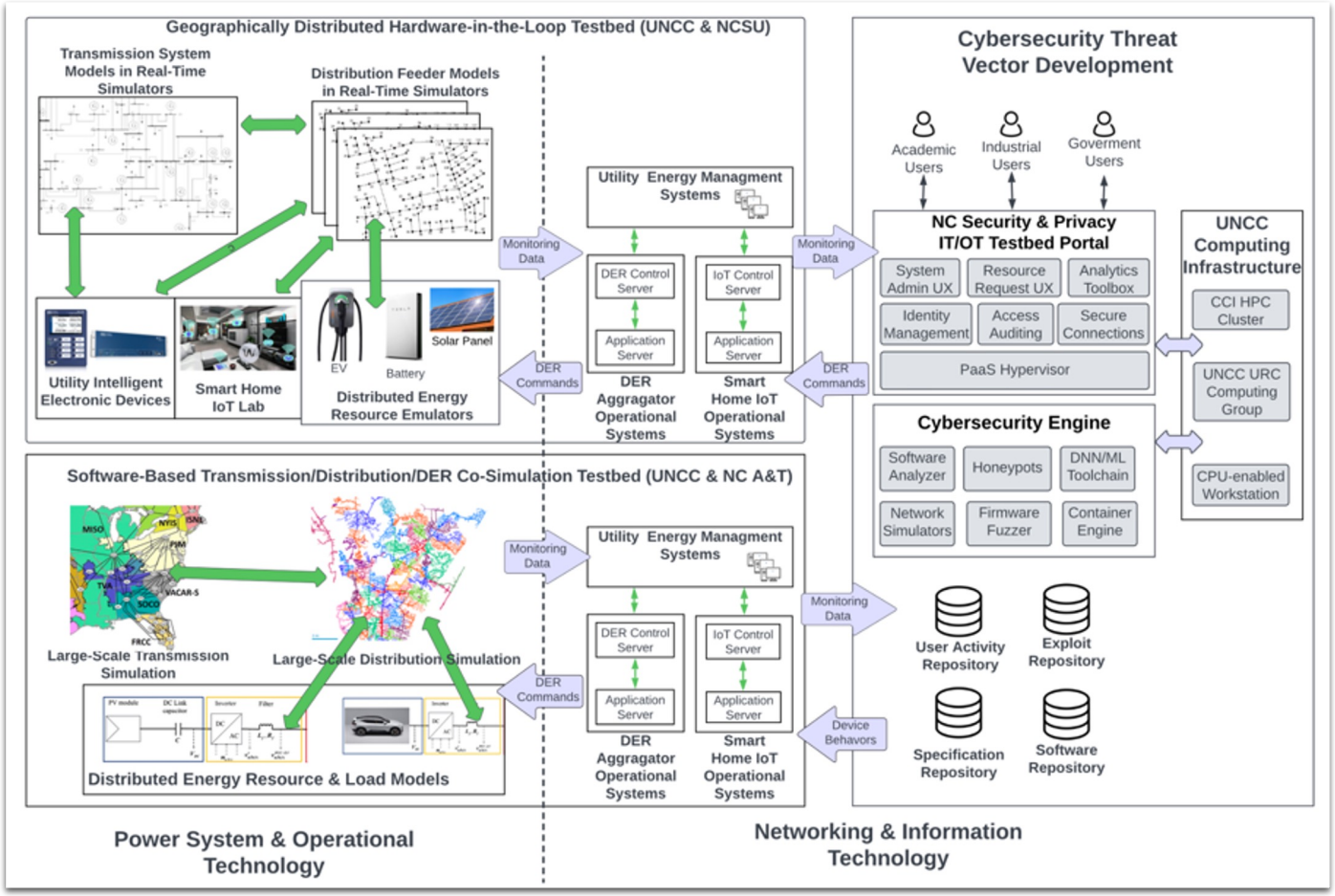
N★C

COMMERCIALIZATION & ECONOMIC GROWTH

- Collaboration with with local industry
- Sustainable contribution to NC's economy
- commercialization opportunities
- attract large-scale external funding to the state and university

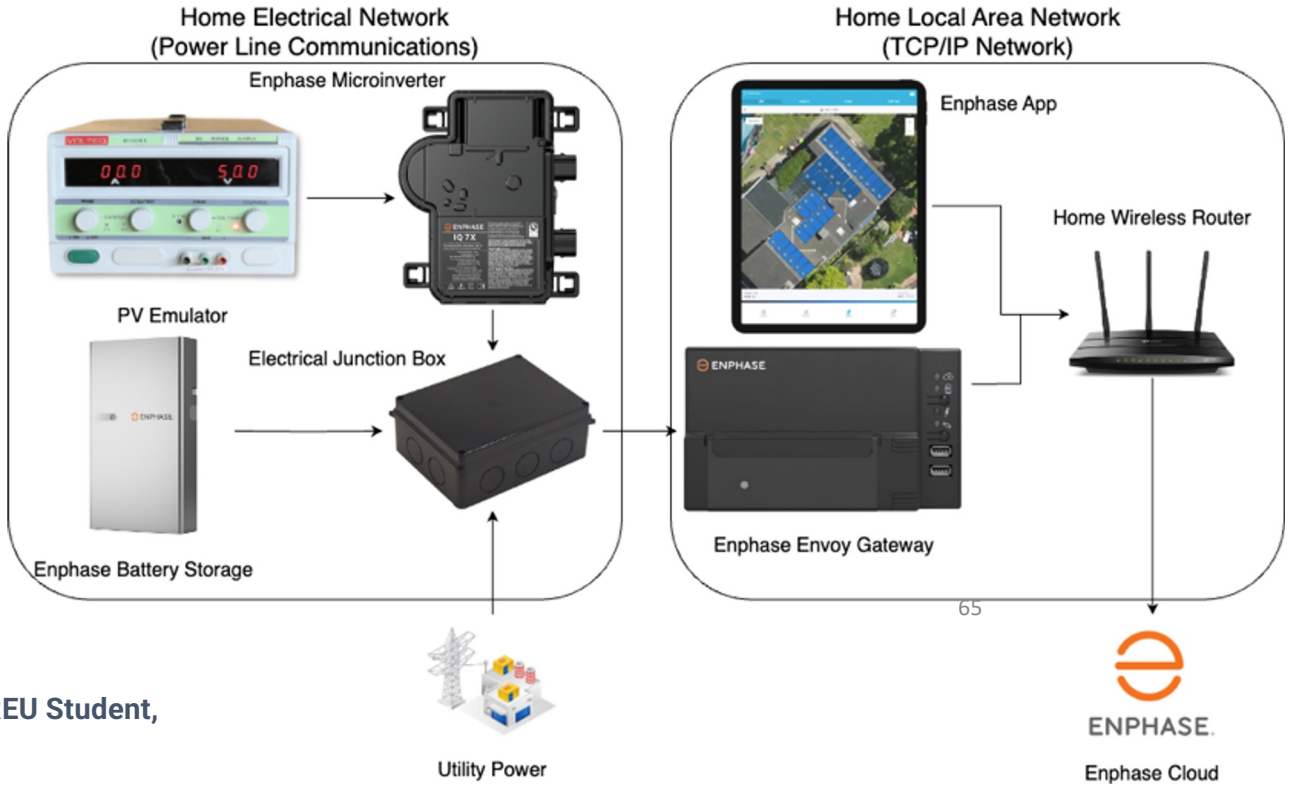
Human-in-the-Loop (***HIL***) Testbed

Software-Based Integrated Tx&D Testbed



CENTER FOR ENERGY

HIL Testbed with a Home Solar System in a Micro Smart Home



Nick Wind-McJetters, NSF REU Student, Summer 2024

CENTER FOR ENERGY

Cybersecurity Engine & User Portal

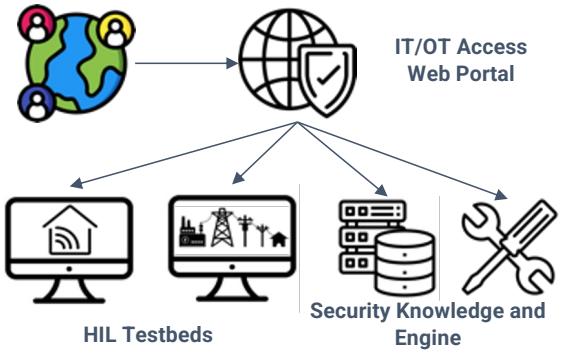
Security Knowledge Base

- DER Vulnerability Reports
- DER Software/Firmware
- DER Standards/Specifications
- Existing Exploitations

Security Analysis Engine

- Binary/Source Analysis Tools
- Network Simulators
- Formal Verification Toolkits
- AI-assisted Fuzzing/Penetration Testing

Secure Web Portal



- Secure, flexible access for external users
- Resource request allocation
- Identify Management, auditing
- Visualization, data analytics, user analytics

Proposed Themes & Topics Options

- Smart Grid Security, issues with
  - grid infrastructure,
  - connectivity & network infrastructure,
  - cyber-physical systems (CPS),
  - cyber-social systems
  - natural/human-made disasters
- Identity Security, issues with
  - identification, thru biometrics, etc.
  - liveness,
  - deep fakes

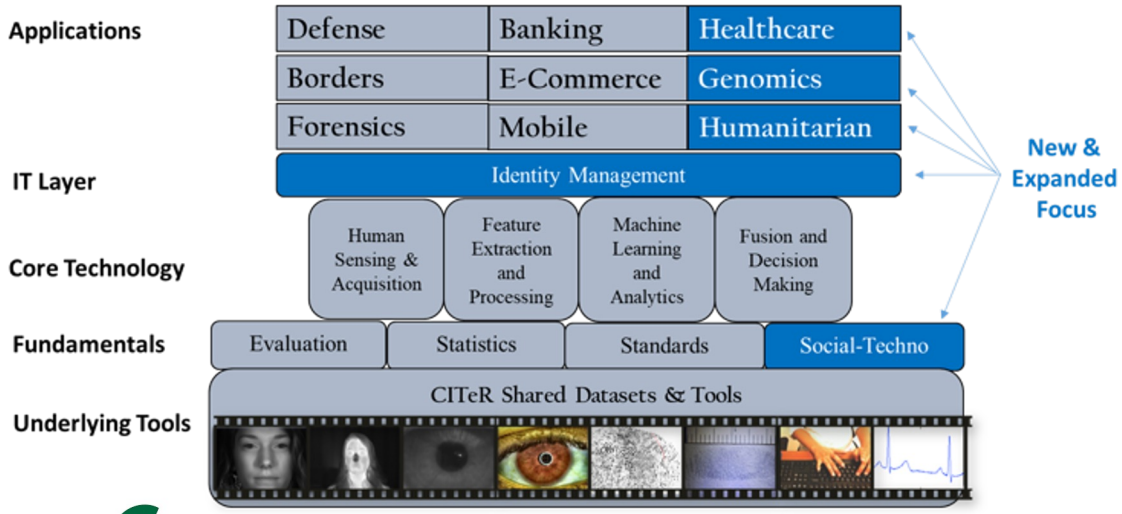
The Dubois Center
UNC Charlotte

UNIVERSITY OF NORTH CAROLINA CHARLOTTE

Center for Identification Technology Research (CITeR)

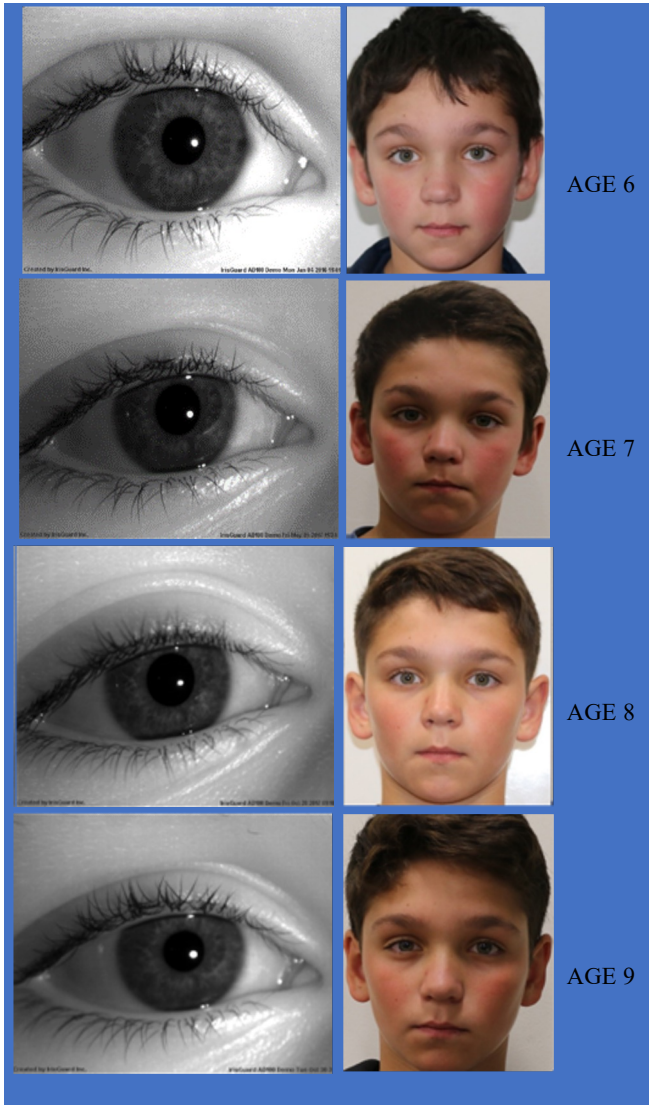
A National Science Foundation (NSF) Industry/University Cooperative Research Center (IUCRC)

Working in partnership with our government and industry stakeholders to advance the state of the art in human identification capabilities through coordinated university research



Clarkson · Michigan State University · West Virginia University · idiap Research Institute · University at Buffalo The State University of New York

Planned site University of North Carolina Charlotte



Aging In Biometrics

PROBLEM
Biometric traits may change as a person ages, particularly in children

RESEARCH DIRECTION
Development and assessment of models for fingerprint, face, voice, and iris aging

RESEARCH DIRECTION
Study of toe print recognition as a possible first biometrics

RESEARCH DIRECTION
Improving segmentation in child fingerprint slap images

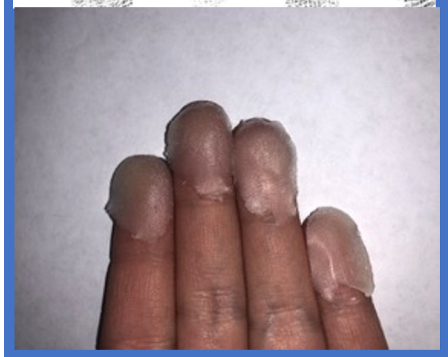
OUTCOMES
· Benchmark Datasets Children
· Age mitigation techniques
· Leading publications in the field

Das, P, et al, Longitudinal Performance of Iris Recognition in Children: Time Intervals up to Six years, 2023
Bahmani, K. et al. Face Recognition In Children: A Longitudinal Study
Das, P, et al. Iris Recognition Performance in Children: A Longitudinal Study. 2021.
Yambay, D., et al, A Feasibility Study on Utilizing Toe Prints for Biometric Verification of Children. 2019.
Das, P., et al, Analysis of dilation in children and its impact on iris recognition. 2020.
Purnapatra, S., et al. Longitudinal study of voice recognition in children. 2020.
J. J. Engelsma, et al, Infant-ID: Fingerprints for Global Good", 2021.
D. Deb, et al, Identifying Missing Children: Face Age-Progression via Deep Feature Aging, 2021.
Singh, Set al., 2024. Longitudinal Evaluation of Child Face Recognition and the Impact of Underlying Age.
Sumi, M.R., Imtiaz, M. and Schuckers, S., 2024. A Longitudinal Study on Fingerprint Recognition in Infants, Toddlers, and Children.

CITeR
Center for Identification Technology Research

Noncontact Finger Photo

Contact Fingerprint



Spoof Noncontact Finger Photo

Noncontact Fingerprint Recognition

PROBLEM

Perform fingerprint recognition on the basis of a photo of a person's fingers, i.e. noncontact

RESEARCH DIRECTIONS

· Develop benchmark datasets of live and spoof images from various capture technologies (standalone sensors, smartphone apps, etc.)

· Develop matching algorithms for noncontact compared to contact fingerprint images to address operational nonidealities in capture, such as blur and nonuniform illumination

· Evaluate match score differentials for various demographic groups (gender, ethnicity, finger size, etc.)

OUTCOMES

· Database of non-contact finger photos and contact fingerprints

· Database of live and spoof non-contact finger photos

· Software for contact to non-contact finger matching

· Patent awarded: N. M. Nasrabadi, J. Dawson and A. Dabouei, A. Joshi, "Fingerphoto Deblurring using Deep Learning GAN Architectures," Patent issued 4/20/2024, Patent No. 11,972,630

Jawade, B et al, 2022. RidgeBase: A Cross-Sensor Multi-Finger Contactless Fingerprint Dataset

Purnapatra, S. et al, 2023. Presentation Attack Detection with Advanced CNN Models for Noncontact-based Fingerprint Systems

Hasan, M.M., et al, 2023. On Improving Interoperability for Cross-domain Multi-finger Fingerprint Matching Using Coupled Adversarial Learning

Joshi, A.S., et al, 2023. Fingerphoto Deblurring Using Attention-Guided Multi-Stage GAN

King, C., et al, 2023. Contactless Fingerprints: Differential Performance for Fingers of Varying Size and Ridge Density

Liveness Detection Competition- Noncontact-based Fingerprint Algorithms and Systems (LivDet-2023 Noncontact Fingerprint)

Adami, B. et. al., 2023. A Universal Anti-Spoofing Approach for Contactless Fingerprint Biometric Systems

Keaton, D.C. et al, 2024. FDWST: Fingerphoto Deblurring using Wavelet Style Transfer

Joshi, A.S. et al, UFQA: Utility guided Fingerphoto Quality Assessment

CITeR Center for Identification Technology Research

Face Morphing

PROBLEM
Two individuals both match a single morphed image and are able to share an identity

RESEARCH DIRECTION
Morph Detection based on Deep Siamese Networks and Attention Aware Wavelet Sub-bands

RESEARCH DIRECTION
Face Demorphing: Deducing Images Used to Generate a Morph

RESEARCH DIRECTION
Creation of Face Morphs based on Generative Adversarial Networks

OUTCOMES
- Benchmark Datasets of High Quality Face Morphs
- Software for Face Morph Detection
- Leading publications in the field

Blasingame, Z., et al,. Leveraging Adversarial Learning for the Detection of Morphing Attacks, etc., 2021.
Aghdaie, P., et al. Attention aware wavelet-based detection of morphed face images,2021
Chaudhary, B., et al., 2021. Differential Morph Face Detection Using Discriminative Wavelet Sub-Bands. 2021
Soleymani, Sl., et al. Differential morphed face detection using deep Siamese networks. 2021
R. Sharma, A. Ross, Image-level Iris Morph Attack, 2021.
S. Banerjee, A. Ross, Conditional Identity Disentanglement for Differential Face Morph Detection, 2021
Sobhan Soleymani, et al, Mutual Information Maximization on Disentangled Representations for Differential Morph Detection, 2021
Kashiani, H., et al., 2022, October. Robust ensemble morph detection with domain generalization. 2022
Zhang, N., et al., 2022. Fusion-based Few-Shot Morphing Attack Detection and Fingerprinting.
Blasingame, Z., et al., 2023. Leveraging Diffusion for Strong and High Quality Face Morphing Attacks
Aghdaie, P., et al., 2023. Attention Augmented Face Morph Detection
Kashiani, H., et al., 2023. Towards Generalizable Morph Attack Detection with Consistency Regularization

CITeR
Center for Identification Technology Research

Lip-syncing Deepfake of President Kennedy

Original video frame of President Kennedy

Detection of Deepfakes

PROBLEM
Detection of image manipulation and deepfakes

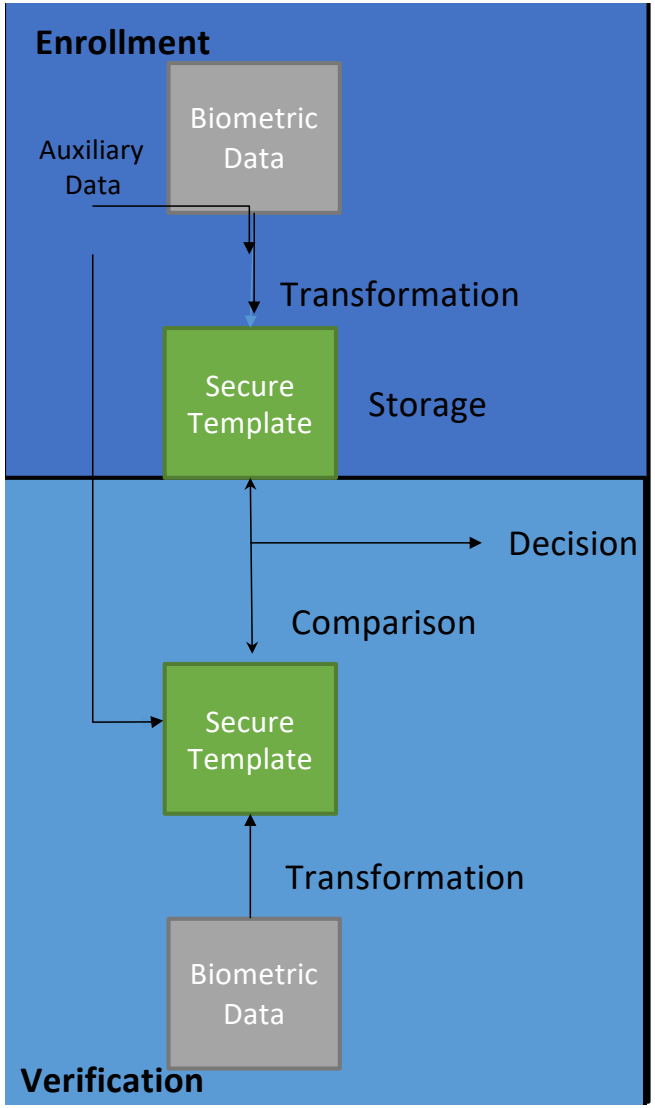
RESEARCH DIRECTIONS

- Identification of authentic voice from synthesized voice, e.g., text-to-speech and voice conversion
- Detection of lip-syncing deepfake videos
- Development of multimodal deepfake video detection
- Evaluation of protection of deepfake injection attacks, such as challenge response

OUTCOMES

- Software for detection of deepfakes and image manipulation
- Dataset of DeepFake Videos (e.g. https://swan-df.github.io/)

Sun, C., et al, 2023. Ai-synthesized voice detection using neural vocoder artifacts
Muppalla, S., et al, 2023. Integrating audio-visual features for multimodal deepfake detection
Kanti Datta, S., et al, 2024. Exposing Lip-syncing Deepfakes from Mouth Inconsistencies
Yan, Z., et al, 2023. Deepfakebench: A comprehensive benchmark of deepfake detection
Sun, C., et al, 2023. Using Vocoder Artifacts For Audio Deepfakes Detection
Yang, S., et al, 2023. Improving cross-dataset deepfake detection with deep information decomposition
Zhang, C., et al, 2023. Contrastive Multi-Face Forensics: An End-to-end Bi-grained Contrastive Learning Approach for Multi-face Forgery Detection
Ju, Y., et al, 2023. Glff: Global and local feature fusion for ai-synthesized image detection
Guo, H., et al, 2023, June. Detection of real-time deepfakes in video conferencing with active probing and corneal reflection
Sun, P., et al, 2023. FakeTracer: proactively defending against face-swap DeepFakes via implanting traces in training



Template Security

PROBLEM

One way transformation of biometric data such that matching can be performed without revealing original biometric data

RESEARCH DIRECTION

Homomorphic encryption for search

RESEARCH DIRECTION

Privacy-preserving biometric-based authentication using secure multi-party computation

RESEARCH DIRECTION

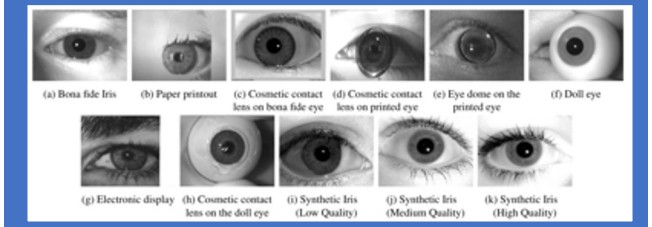
Significant feature based representation for template protection

OUTCOMES

- Software (e.g. PolyProtect https://gitlab.idiap.ch/bob/bob.paper.polyprotect_2021)
- Demonstration of viability of biometric template security algorithms

Yalavarthi et al, "Enhancing Privacy in Face Analytics Using Fully Homomorphic Encryption," FG 2024
Singh, S., Igene, L. and Schuckers, S., 2024. Securing Biometric Data: Fully Homomorphic Encryption in Multimodal Iris and Face Recognition.
Sharma et al, "Fully Homomorphic Encryption Operators for Score and Decision Fusion in Biometric Identification," WIFS 2023
L Sperling, N Ratha, A Ross and V Boddeti, "HEFT: Homomorphically Encrypted Fusion of Biometric Templates," IJCB 2022
V. Talreja, et al, Deep hashing for secure multimodal biometrics," 2021
O. Ouda, et al, Cancelable Biometrics Vault: A Secure Key-Binding Biometric Cryptosystem based on Chaffing and Winnowing, 2021
Krivokuća Hahn, V. and Marcel, S., 2021, Towards Protecting Face Embeddings in Mobile Face Verification Scenarios.

CITeR
Center for Identification Technology Research



Presentation Attack Detection

PROBLEM

Biometric recognition may be vulnerable to fake biometrics

RESEARCH DIRECTIONS

- Evaluate state-of-the-art algorithms through competitions—LivDet
- Develop software and hardware approaches for liveness detection—software PAD, 3D finger vein based on photoacoustics
- Prepare new and novel methods spoofing-face masks, realistic skin-colored finger spoofs, blood infused finger spoofs, vanadium dioxide films for iris.

OUTCOMES

- Shared datasets
- LivDet competitions for face, iris, and fingerprint

Jauhari et al, “Iris Presentation Attack: Assessing the Impact of Combining Vanadium Dioxide Films with Artificial Eyes,” WACVW 2024

Igene, L., et al Face Liveness Detection Competition (LivDet-Face)-2024.

Purnapatra, S., Liveness Detection Competition-Noncontact-based Fingerprint Algorithms and Systems (LivDet-2023 Noncontact Fingerprint).

Micheletto, M., et al, 2023. Review of the fingerprint liveness detection (livdet) competition series: from 2009 to 2021.

Tinsley, P., et al, 2023, September. Iris Liveness Detection Competition (LivDet-Iris)–The 2023 Edition.

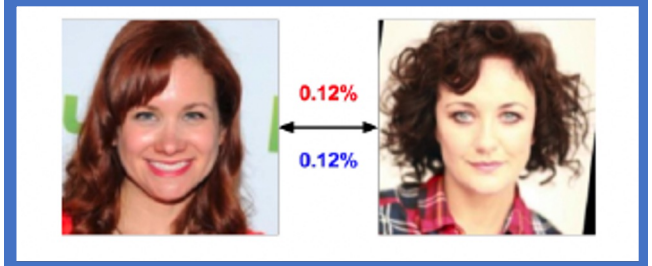
S. Purnapatra et al., "Presentation Attack Detection with Advanced CNN Models for Noncontact-based Fingerprint Systems," 2023

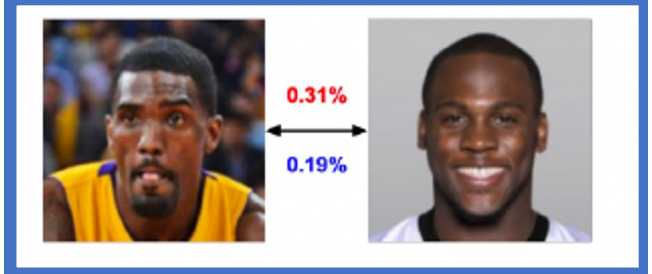
Adami B, A universal anti-spoofing approach for contactless fingerprint biometric systems, 2023.

Purnapatra, S., Liveness Detection Competition-Noncontact-based Fingerprint Algorithms and Systems (LivDet-2023 Noncontact Fingerprint).

Micheletto, M., et al, 2023. Review of the fingerprint liveness detection (livdet) competition series: from 2009 to 2021.

CITeR
Center for Identification Technology Research





Two cases of comparisons (reported as % similarity) for a biased FR system (red) and an unbiased FR system (blue)

Bias in Face Recognition

PROBLEM
Performance in biometric recognition can vary based on demographics

RESEARCH DIRECTION
Development of measures of fairness appropriate for biometric recognition

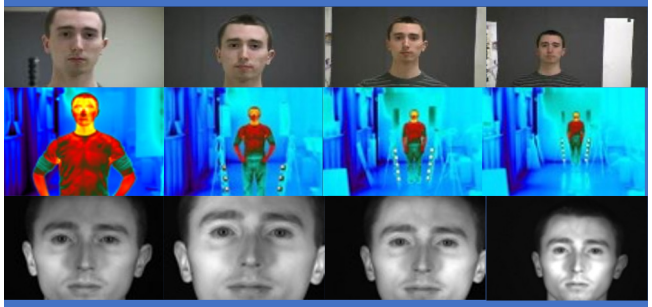
RESEARCH DIRECTION
Development of a measure of skin tone from a single image, particularly useful for unlabeled datasets

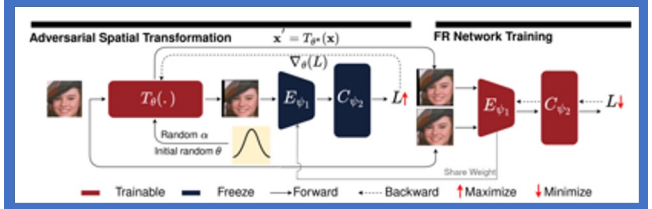
RESEARCH DIRECTION
Large scale equity study of remote identity verification software

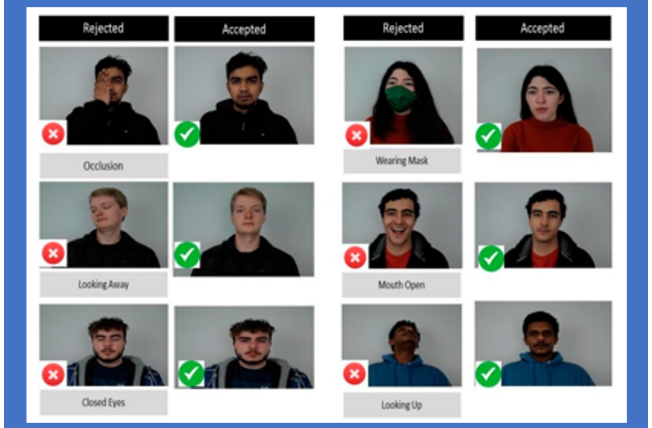
OUTCOMES
· Code for skin tone and bias metrics (e.g. https://gitlab.idiap.ch/bob/bob.paper.fdr)
· Statistical methods for bias mitigation

Chen, X et al 2022. Exploring racial and gender disparities in voice biometrics.
Schuckers, M., et al 2022. Statistical Methods for Assessing Differences in False Non-Match Rates Across Demographic Groups.
Schuckers, M., et al 2023. Statistical Methods for Testing Equity of False Non Match Rates Across Multiple Demographic Groups.
Drahos, J et al, 2023. Generalizability and Application of the Skin Reflectance Estimate Based on Dichromatic Separation (SREDS).
Fatima, K., et al 2024,. A large-scale study of performance and equity of commercial remote identity verification technologies across demographics.

CITeR
Center for Identification Technology Research







Face Image Quality

PROBLEM
Measure, improve, and fuse quality in order to improve biometric performance

RESEARCH DIRECTION
Face image quality vector

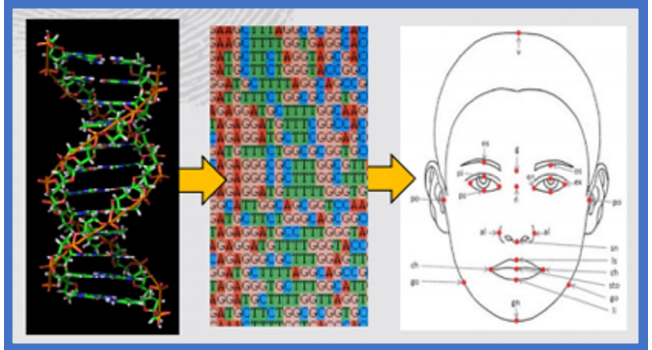
RESEARCH DIRECTION
Alignment robustness to improve low-quality face recognition

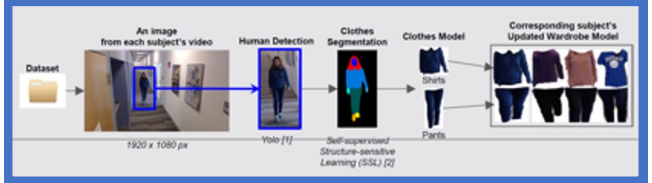
RESEARCH DIRECTION
Face aware, real-time face capture

OUTCOMES
· Quality software
· Quality—Face/Iris Research Ensemble (Q-FIRE) II: Unconstrained Dataset
· Open source software for real-time face quality

Saadabadi, M.S.E., et al 2024. ARoFace: Alignment Robustness to Improve Low-Quality Face Recognition.
Sarker, M.A.B., Hossain, S.S., Venkataswamy, N.G., Schuckers, S. and Imtiaz, M.H., 2024. An Open-Source Face-Aware Capture System. Electronics, 13(7), p.1178.
Najafzadeh, N., et al., 2023. Face image quality vector assessment for biometrics applications. In Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (pp. 511-520).
Dale, M.R., et al., 2023, December. To Impute or Not: Recommendations for Multibiometric Fusion

CITeR
Center for Identification Technology Research





Soft & Novel Biometrics

PROBLEM

Develop novel biometrics and assess its capability for varying applications

RESEARCH DIRECTION

Study of relationship between DNA to Face

RESEARCH DIRECTION

RESEARCH DIRECTION

Development of wardrobe models for person re-identification

OUTCOMES

- Wardrobe dataset
- Attribute-based person reidentification

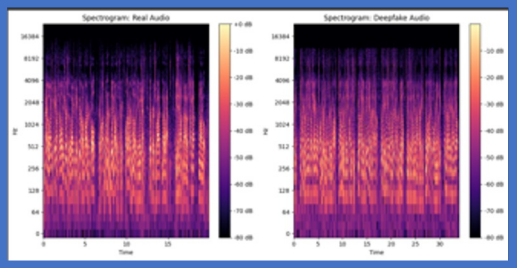
-K.W. Lee, B. Jawade, D.D. Mohan, N. Ratha, S. Setlur, V. Govindaraju, “Attribute De-biased Vision Transformer (AD-ViT) for Long-Term Person Re-identification”, 18th IEEE International Conference on Advanced Video and Signal-Based Surveillance (AVSS), 2022.

-Chen, B., et al. A stimulus-response based EEG biometric using mallows distance. CCF Trans. Netw. 3, 128–139 (2020).

-K. W. Lee et al., "Bayesian Personalized-Wardrobe Model (BP-WM) for Long-Term Person Re-Identification," 2021 17th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS), 2021, pp. 1-8.

-Labati, R.D., Ross, A. and Dantcheva, A., 2023. Soft Biometrics. Encyclopedia of Cryptography, Security and Privacy.

CITeR
Center for Identification Technology Research



Enhancing Automatic Speaker Recognition

PROBLEM

To improve speaker recognition and tackling synthetic and deepfake speech challenges.

RESEARCH DIRECTION

Detect deepfake speech and mitigate its impact on speaker recognition systems

RESEARCH DIRECTION

Use of synthetic speech to enhance speaker recognition datasets, ensuring diversity and improving model performance

RESEARCH DIRECTION

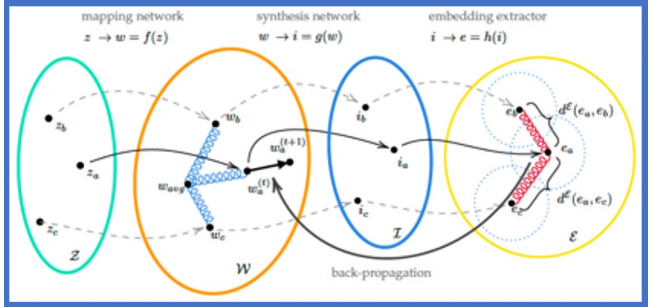
Correlate audio quality metrics with recognition accuracy and develop noise-resilient enhancement techniques.

OUTCOMES

- Extended-Length Audio Dataset for Synthetic Voice Detection and Speaker Recognition
- Evaluated existing DL-based audio Denoising methods and identified strength and weakness

-A. Ahmed, M. J. A. Khondkar, A. Herrick, S. Schuckers and M. H. Imtiaz, "Descriptor: Voice Pre-Processing and Quality Assessment Dataset (VPQAD)," in IEEE Data Descriptions, vol. 1, pp. 146-153, 2024, doi: 10.1109/IEEEDATA.2024.3493798.
-A Ahmed and M Imtiaz, Various SNR Computations for Automatic Speaker Recognition Task, 2024, IEEE HI POCT Conference, Arizona, USA
-Alim, A.; Purnapatra S.; Schuckers, S.; Imtiaz, M. Open-Source Pipeline for Noise-Resilient Voice Data Preparation. Preprints 2024. https://doi.org/10.20944/preprints202405.0877.v1
-Soleymani, S., et al, Prosodic-Enhanced Siamese Convolutional Neural Networks for Cross-Device Text-Independent Speaker Verification, 2018.

CITeR
Center for Identification Technology Research



Exploration of the GAN latent space W by introducing a repulsive force between the face embeddings E so that they naturally arrange themselves in an assembly that maximize their inter-class distances

Synthetic Dataset Generation

PROBLEM

Generate datasets of synthetic biometrics as a substitute to real image for biometric recognition

RESEARCH DIRECTION

Investigate the use of AI generated synthetic biometrics data for training DNN-based systems

RESEARCH DIRECTION

Development of a novel method to explore the latent space of generative adversarial networks, inspired by the physical motion of soft particles subjected to stochastic Brownian forces, and casting the exploration as a sphere packing problem in the embedding space

RESEARCH DIRECTION

In-depth evaluation of utility and realism of synthetically generated data

OUTCOMES

- Software code soon: https://www.idiap.ch/paper/synthetics-disco/
- Synthetic datasets on Zenodo: https://zenodo.org/records/11474048

Geissbuhler, D. et al 2024. Synthetic Face Datasets Generation via Latent Space Exploration from Brownian Identity Diffusion.
Boddeti et al, "On the Biometric Capacity of Generative Face Models," IJCB 2023
Yadav and Ross, "iWarpGAN: Disentangling Identity and Style to Generate Synthetic Iris Images," IJCB 2023
Yadav and Ross, "CIT-GAN: Cyclic Image Translation Generative Adversarial Network With Application in Iris Presentation Attack Detection," WACV 2021

CITeR Center for Identification Technology Research

Outcomes

Datasets/Tools*

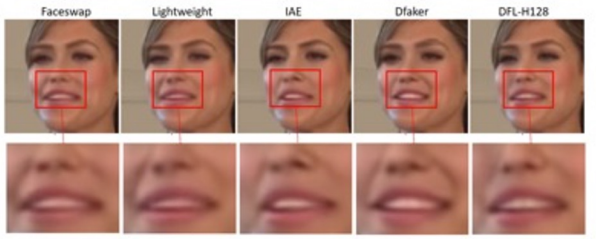
- Dataset: DFDM (DeepFake videos from Different Models)
- Dataset: LivDet Face 2021 (Live and spoof face images)
- Tool: CU Account Recovery Keystroke Software
- Tool: CU SREDS Skin Reflectance Tool

Challenge Problem Workshops

- Detroit Airport Tour and Workshop, November 2022, Detroit

Educational Videos

- Biometrics 101: The Adventures of Mia and Sofia - YouTube

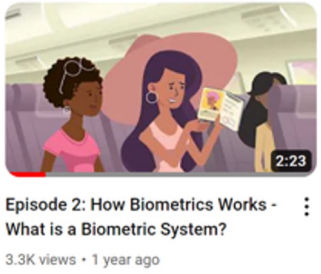


DFDM DeepFake Videos
https://github.com/shanface33/Deepfake_Model_Attribution

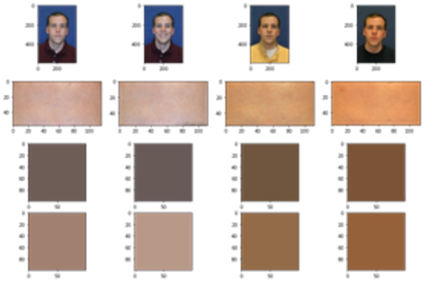
Account Recovery Keystroke Tool

LivDet 2021 Face

**See https://citer.clarkson.edu/research-resources/



CITeR YouTube



SREDS Skin Reflectance

CITeR Current Affiliates—2024

- ACV Auctions
- Athena Sciences
- Aware
- DRDC—Defence Research and Development Canada (DRDC)
- DoD—Defense Forensics and Biometrics Agency
- DoD – Defense Forensic Science Center
- DHS—Office of Biometric Identity Management
- DHS—Science & Technology
- Federal Bureau of Investigation
- General Services Administration (GSA)
- Home Team Science and Technology Agency (HTX) – Singapore
- Idemia
- Ingenium
- iProov
- Metalenz
- National Security Agency (NSA)
- Oak Ridge National Labs (ORNL)
- Precise Biometrics
- PrivateID
- Public Safety Canada
- Qualcomm
- Synolo
- Tech5
- Thales
- Tools for Humanity

Summary of discussion

- Several members pending to *Identity Security*, as it is new and less traditional
- Other members more inclined towards *Smart Grid Security* because it aligns more closely with the working group's scope

- There is a third alternative topic, dependability of medical devices, systems, and software, etc., but this has not been discussed
- We will close this during the 2025 Summer Meeting

CHARLOTTE
COLLEGE OF COMPUTING AND INFORMATICS

Charlotte.edu

Thank you

College of Computing and Informatics (***CCI***): cci.charlotte.edu

UNIVERSITY OF NORTH CAROLINA
CHARLOTTE

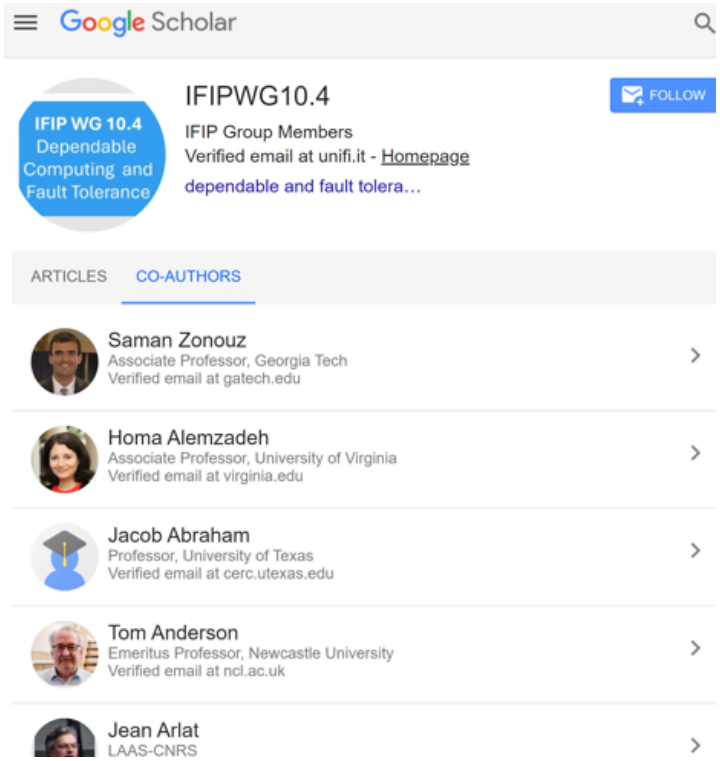
Communication and Outreach

Andrea Ceccarelli

Web site – member page

Members

Google Scholar Link for the Entire Group



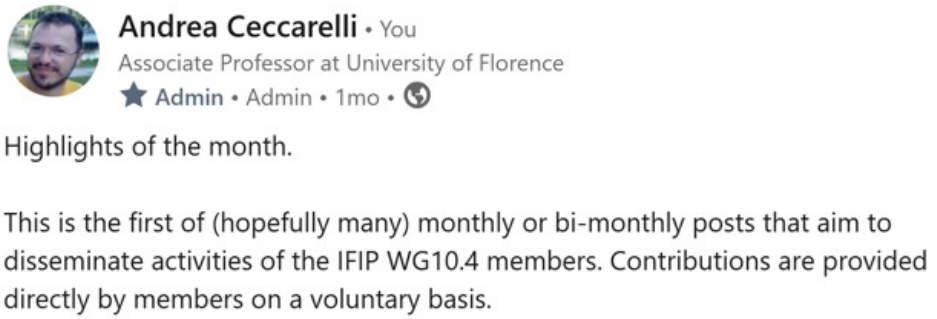
Many personal web pages missing!!!

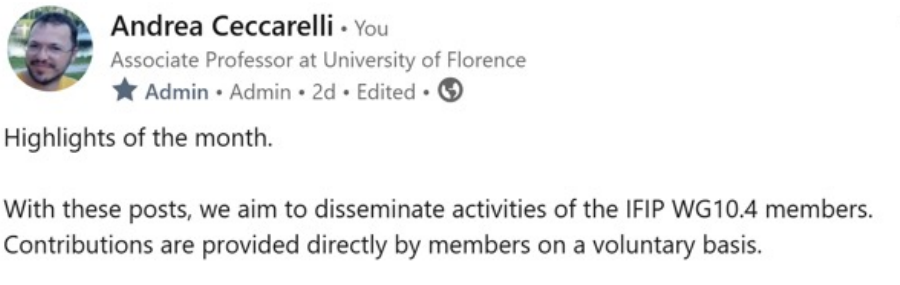
Andrea Ceccarelli (andrea.Ceccarelli@unifi.it)
University of Florence (Italy)

Initiatives from members on Linkedin

2 posts made (December and February)

Not much participation ☹ (9 entries, 6 from comm. Outreach members) … will keep pushing ☺





Second part

Restricted to members of the WG!