UNIVERSITÄT ZU LÜBECK
INSTITUTE FOR IT SECURITY

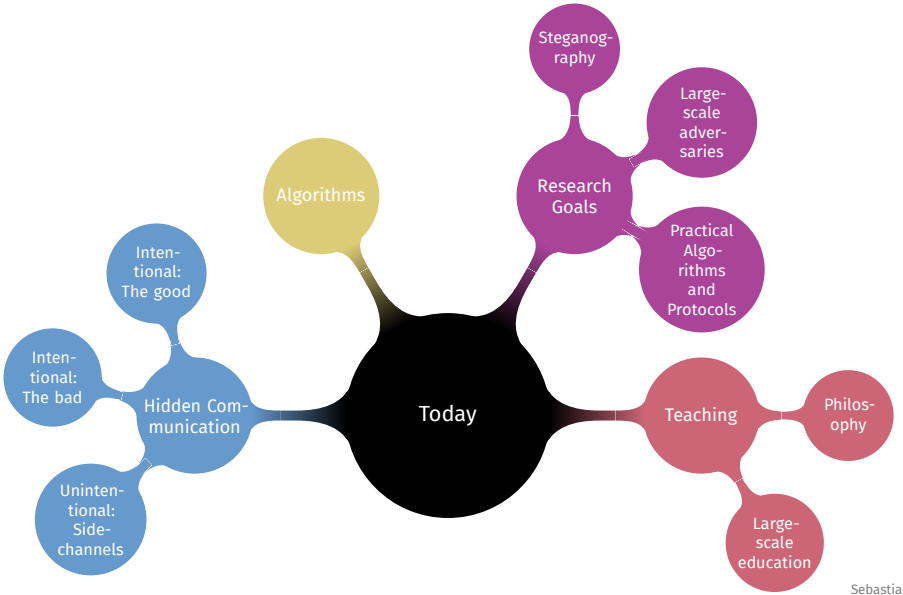
# The many facets of hidden communication

Sebastian Berndt

Institute for IT Security
University of Lübeck

IM FOCUS DAS LEBEN

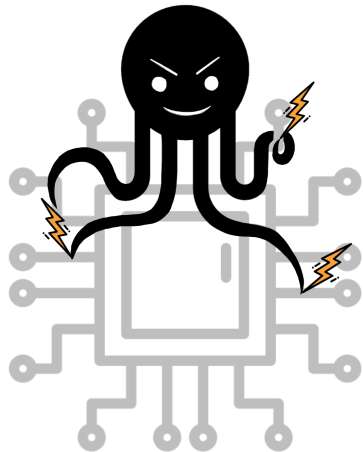
# Overview


Today
Algorithms
Research Goals
Steganography
Large-scale adversaries
Practical Algorithms and Protocols
Hidden Communication
Intentional: The good
Intentional: The bad
Unintentional: Side-channels
Teaching
Philosophy
Large-scale education

# Recent Research: Hidden communication

# Unintentional Communication: Side-channels

- *Implementation* leaks sensitive information via side-channels (Power consumption, Timing, etc.)



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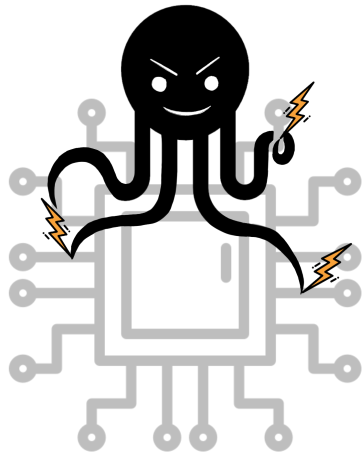

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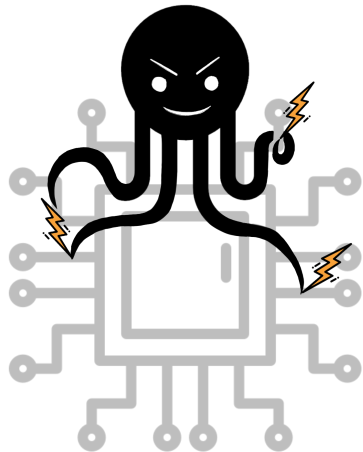

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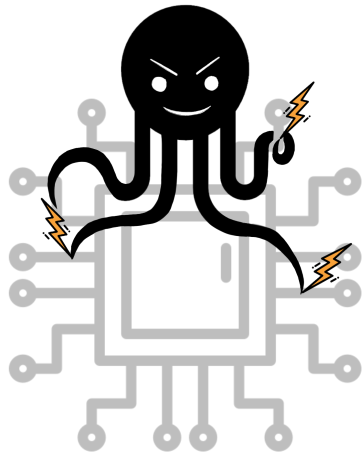
- Attacks against base64 decoding of RSA keys (includes OpenSSL, Botan, NSS, wolfSSL, ...) **[CCS 2021]**



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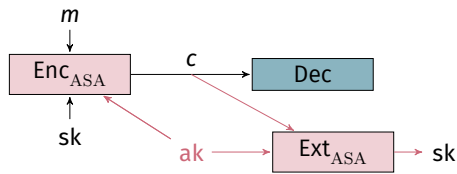

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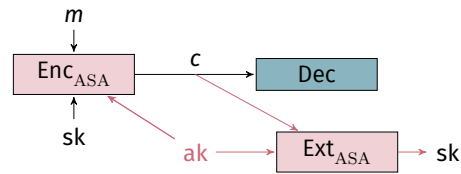

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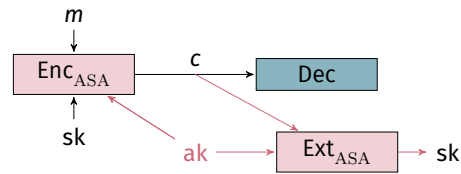

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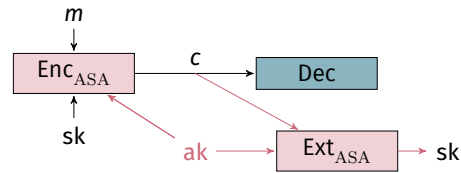

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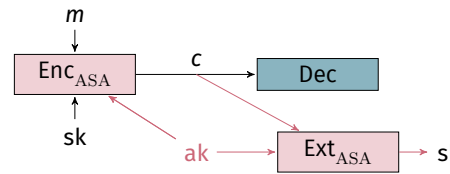

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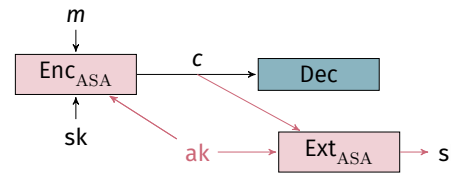
- Earlier: Can be seen as steganography **[CCS 2017]**



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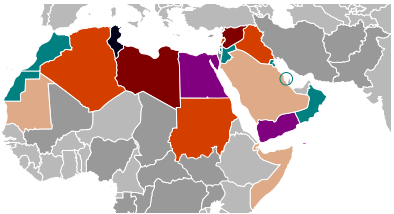

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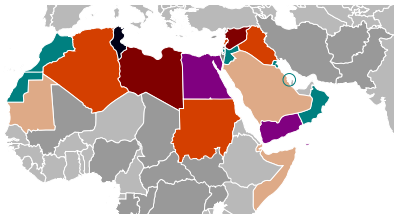

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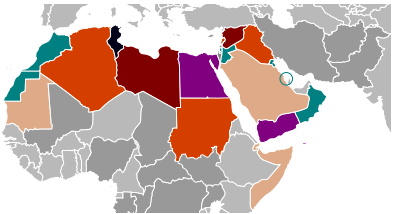

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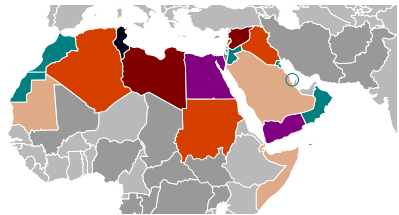
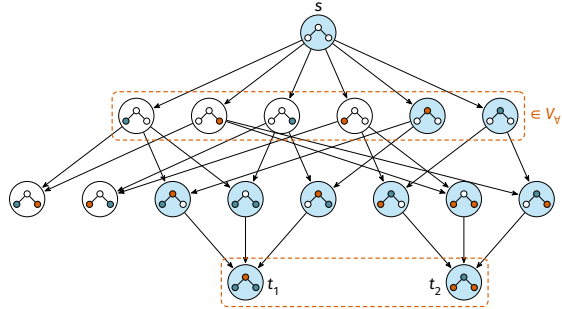


# Algorithms

- Structure of integer programs **[SOSA 2021, SOFSEM 2021]**



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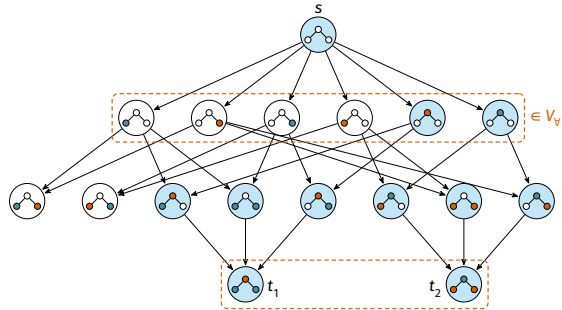

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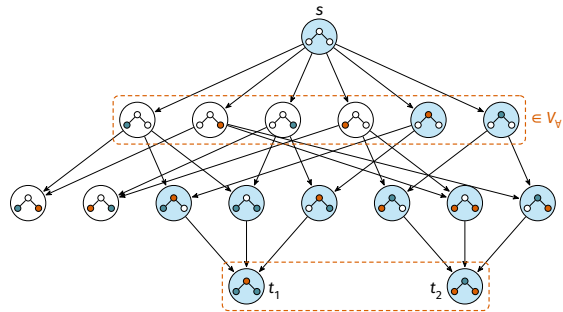
- Efficient implementation of *theoretical* algorithms **[ALENEX 2022, IPEC 2020]**



# Long-term Research Goals: Combine Theory and Practice

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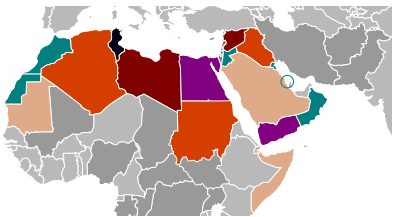

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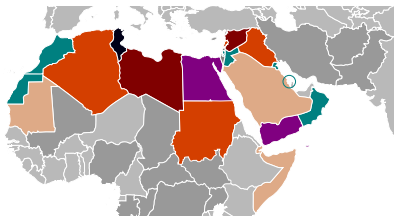

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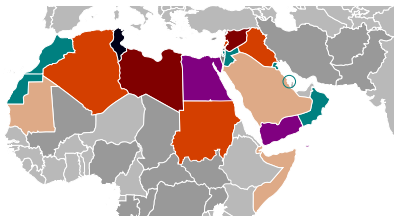
- Understand application scenarios and restrictions **Data for security**



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- Understand possible attack vectors
- Develop and analyze *usable* countermeasures

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- I enjoy collaboration
  (> 30 co-authors from > 7 countries)

# Teaching Visions

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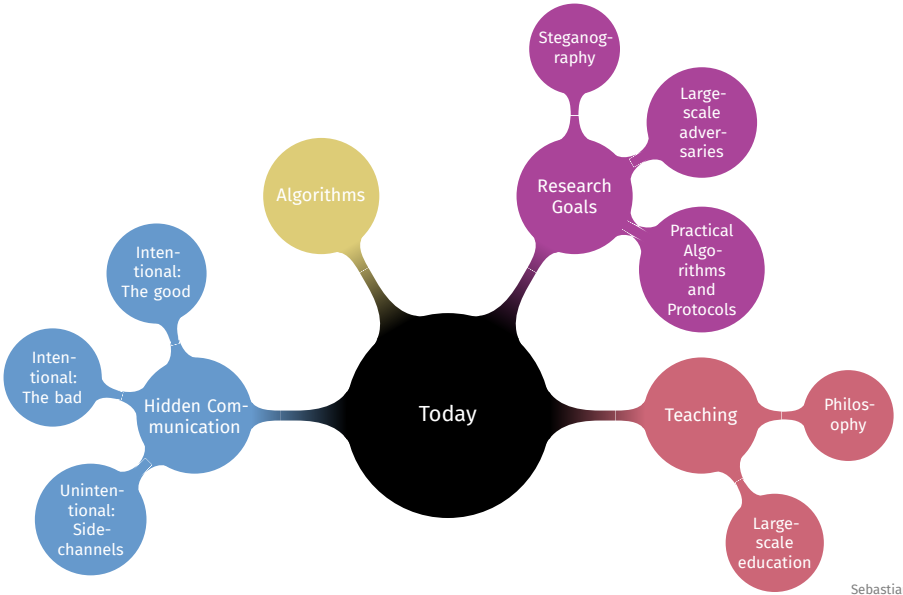
- Use the lessons from the online semesters

# Summary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