



# Are you safe from your contacts? Digital address books, **interdependent privacy**, and why end-to-end encryption is not the Holy Grail

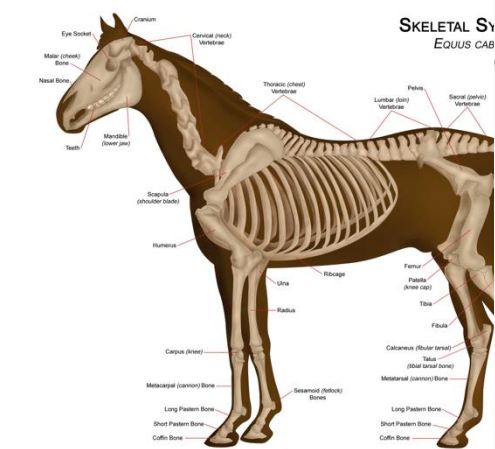
**Gergely Biczók**

CrySys Lab, Budapest Univ. of Technology and Economics

[www.crysys.hu](http://www.crysys.hu)

Standing on the shoulders of giants: Pern Hui Chia (Google ☺), Iraklis Symeonidis (RISE), **Kévin Huguenin\*** and Mathias Humbert (UNIL), ...

# Cambridge Analytica: a „veterinarian horse”



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The Facebook Privacy Setting That Doesn't Do Anything at All

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BRIAN BARRETT SECURITY 03.27.18 12:00 PM

## THE FACEBOOK PRIVACY SETTING THAT DOESN'T DO ANYTHING AT ALL



'I really can't make sense of it.'

—GERGELY BICZOK, CRYSYS LAB

eiendomsmejlere ved salg av bolig.  
Eiendomsmejl.no

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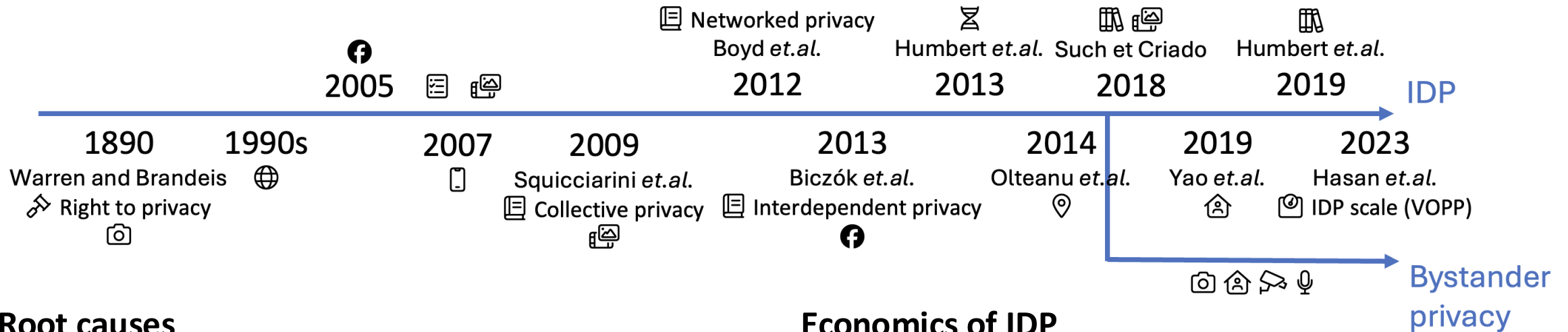


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# Whirlwind tour of interdependent privacy (IDP)

## „Definition”

- A situation where your (in)actions affect the privacy of other individuals



## Root causes


- Someone shares your data (CA)
- Multi-party data (photos, chats)
- Data correlation (genomic, trajectory)
- Collective free-riding (p2p anonymous communications – no cover traffic)

## Economics of IDP

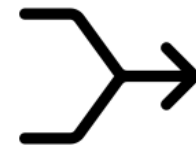
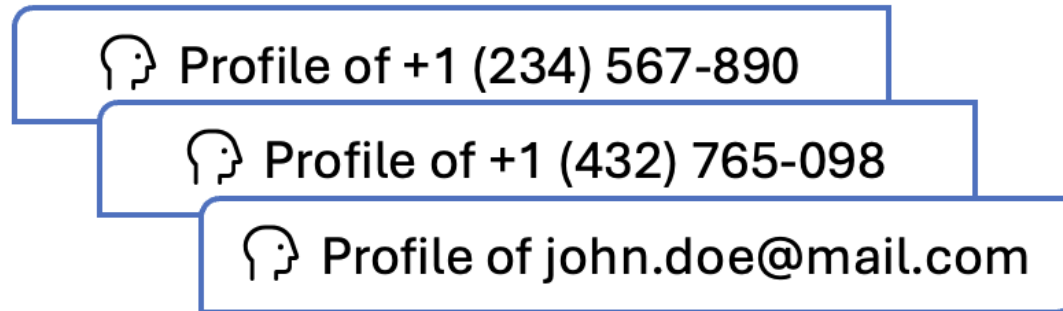
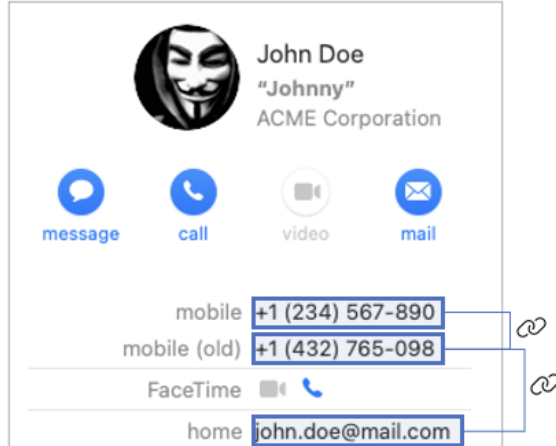
- Negative externalities
- Mitigation: internalize them
  - Tax (Pigou, 1920)
  - Regulate (GDPR, 2016)
  - (Re-)Engineer (Facebook, 2018)

# Digital Address Books (DABs)

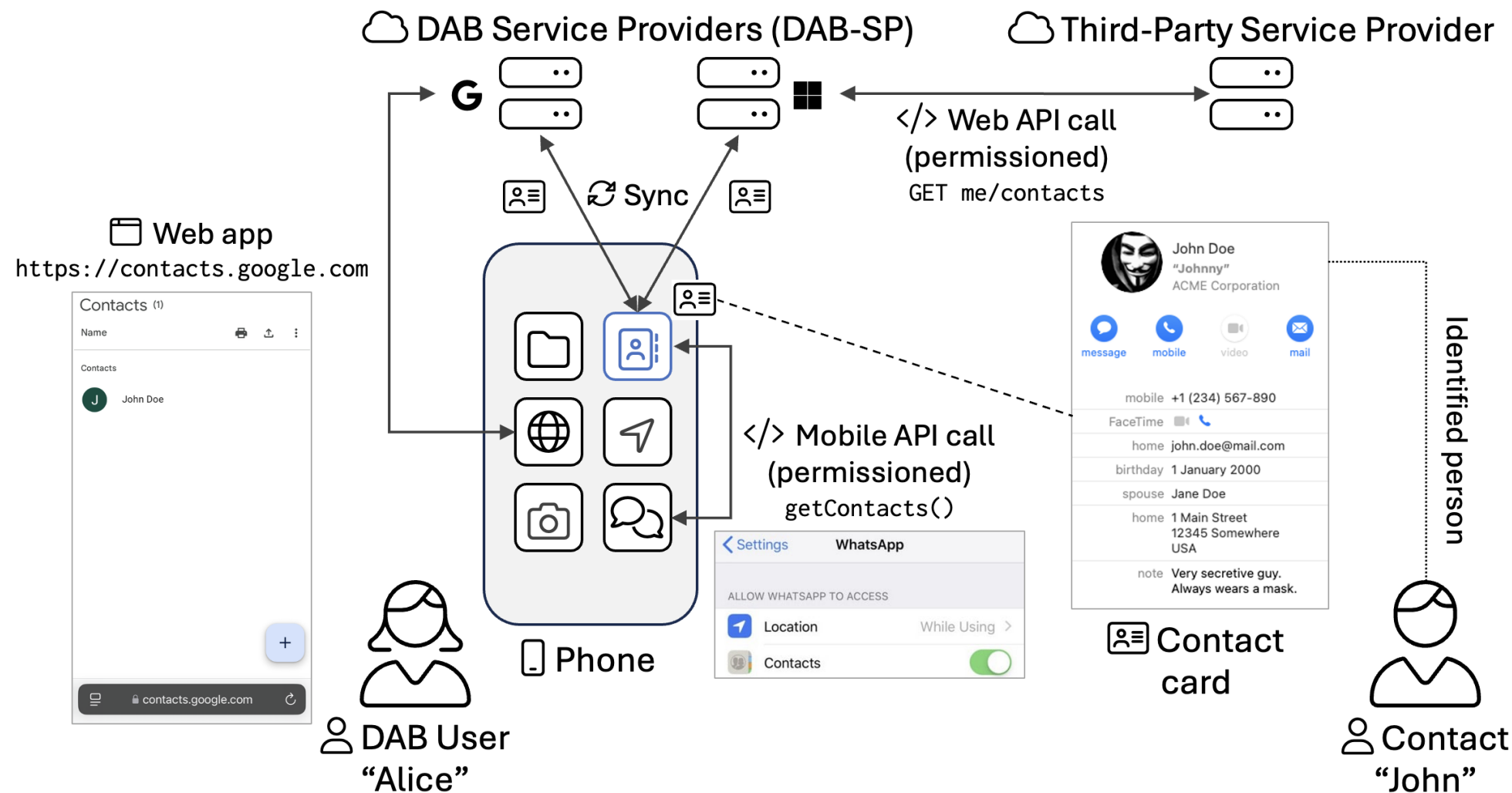
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 Individuals store contact data of *other* individuals, in a structured way, in their digital address books (DAB), which they often sync with online services.

Why does it matter? **Profiling (possibly non-users, cf. shadow profiles)!**



# Digital Address Books



# Legal analysis



- 1) Local DAB or 2) e2e encrypted DAB or 3) Unencrypted online DAB, „general service”
  - DAB SP is Data Processor, 3) Alice is sole DC -> „household exception”, DAB SP is DP
- Unencrypted online DAB, SP influences usage/uses data further
  - Alice and SP are joint Data Controllers
  - **Household exemption only for Alice! SP has to answer John's requests (DAR)**
- **Experiment TLDR: they don't! No features for non-users! Data returned do not contain data from others' DABs (even if John is a user)!**
  - 5 major e-mail/DAB providers, explanations vary 😊

# User studies (don't ask 😊)

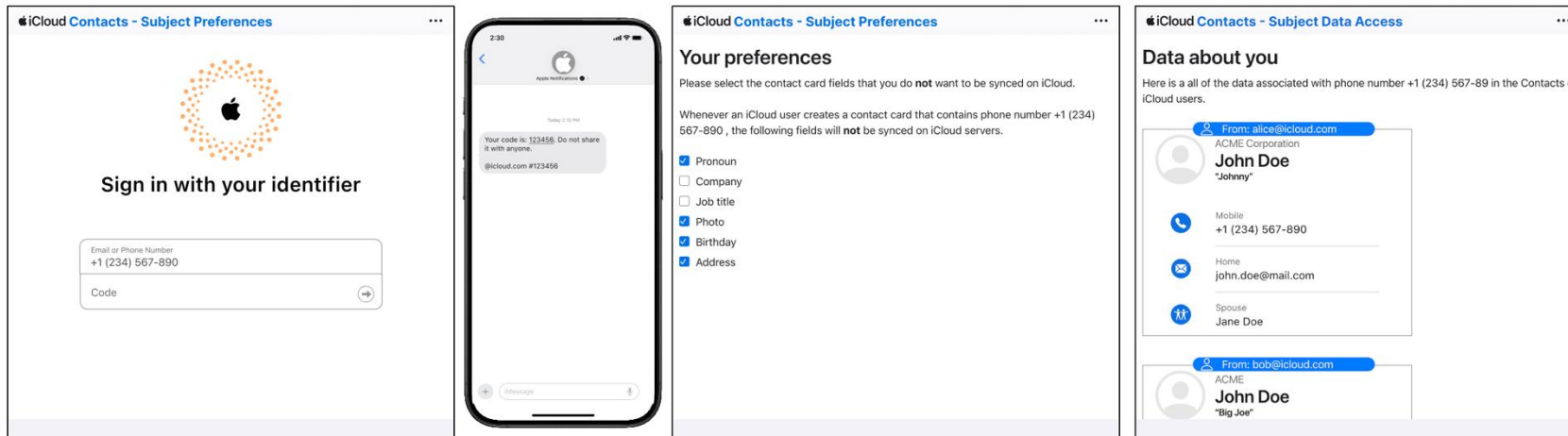
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- Two studies, N = 400+, Prolific
- 80% understand that DAB providers can access data they upload (in the clear)
- 90% self-report 1+ mobile app accessing their contact list
  - 30%: 10+ apps
- Respondents are moderately concerned about *others* exposing *their* data
  - Strong concern for address and photo
- Some concerns about *sharing others'* data
  - But 25% would sell it for a few \$
- Likelihood of *your* birthday shared *by others*: 3.6% (hard data)
  - If you appear in the contact list of 50 DAB users:  $100\% - (100\% - 3.6\%)^{50} = 86\%$  **DAB provider has your birthday**
  - **And you are a non-user...**

# Plans

- DAB providers have no incentive to implement end-to-end encryption
  - Not seeing GDPR fines
  - Exception: where privacy/security is a selling point (Proton)
  - Implementation challenge to decrypt in a web browser
- But users seem to care: dashboard
  - Transparency and control

🔗 Design: dashboard for managing rights to **object** and to **access** 🖱️ With BME





# (Biased) Reading list

## Interdependent Privacy: Let Me Share Your Data

" **COINED THE TERM** "

Gergely Biczók<sup>1</sup> and Pern Hui Chia<sup>2</sup>

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<sup>2</sup> Centre for Quantifiable Quality of Service (Q2S)

Norwegian University of Science and Technology  
chia@q2s.ntnu.no

2013

## A Survey on Interdependent Privacy

MATHIAS HUMBERT, Cyber-Defence Campus, armasuisse Sci  
BENJAMIN TRUBERT and KÉVIN HUGUENIN, Universit

WELL...

2019



## Collateral damage of Facebook third-party applications: a comprehensive study

Iraklis Symeonidis<sup>a,\*</sup>, Gergely Biczók<sup>b</sup>, Fatemeh Shirazi<sup>a</sup>,  
Cristina Pérez-Solà<sup>c</sup>, Jessica Schroers<sup>d</sup>, Bart Preneel<sup>a</sup>

<sup>a</sup> imec-COSIC, KU Leuven, Belgium

<sup>b</sup> CrySyS Lab, Department of Networked Systems and Services, Budapest University of Technology and Economics, Hungary

<sup>c</sup> dEIC, Universitat Autònoma de Barcelona, Spain

<sup>d</sup> Centre for IT & IP Law and imec, KU Leuven, Belgium

2013

CAMBRIDGE A.

## Addressing the Address Books' (Interdependent) Privacy Issues

Kavous Salehzadeh Niksirat<sup>\*†</sup>, Lev Velykoivanenko<sup>\*</sup>, Samuel Mätzler<sup>‡</sup>, Stephan Mulders<sup>§</sup>,  
Aurelia Tamò-Larrieux<sup>\*</sup>, Marc-Olivier Boldi<sup>\*</sup>, Mathias Humbert<sup>\*</sup>, and Kévin Huguenin<sup>\*</sup>

<sup>\*</sup>University of Lausanne

<sup>†</sup>Max Planck Institute for Security and Privacy


<sup>‡</sup>University of Zurich

<sup>§</sup>Maastricht University

2025

# Panel on interdependent privacy (under submission)

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