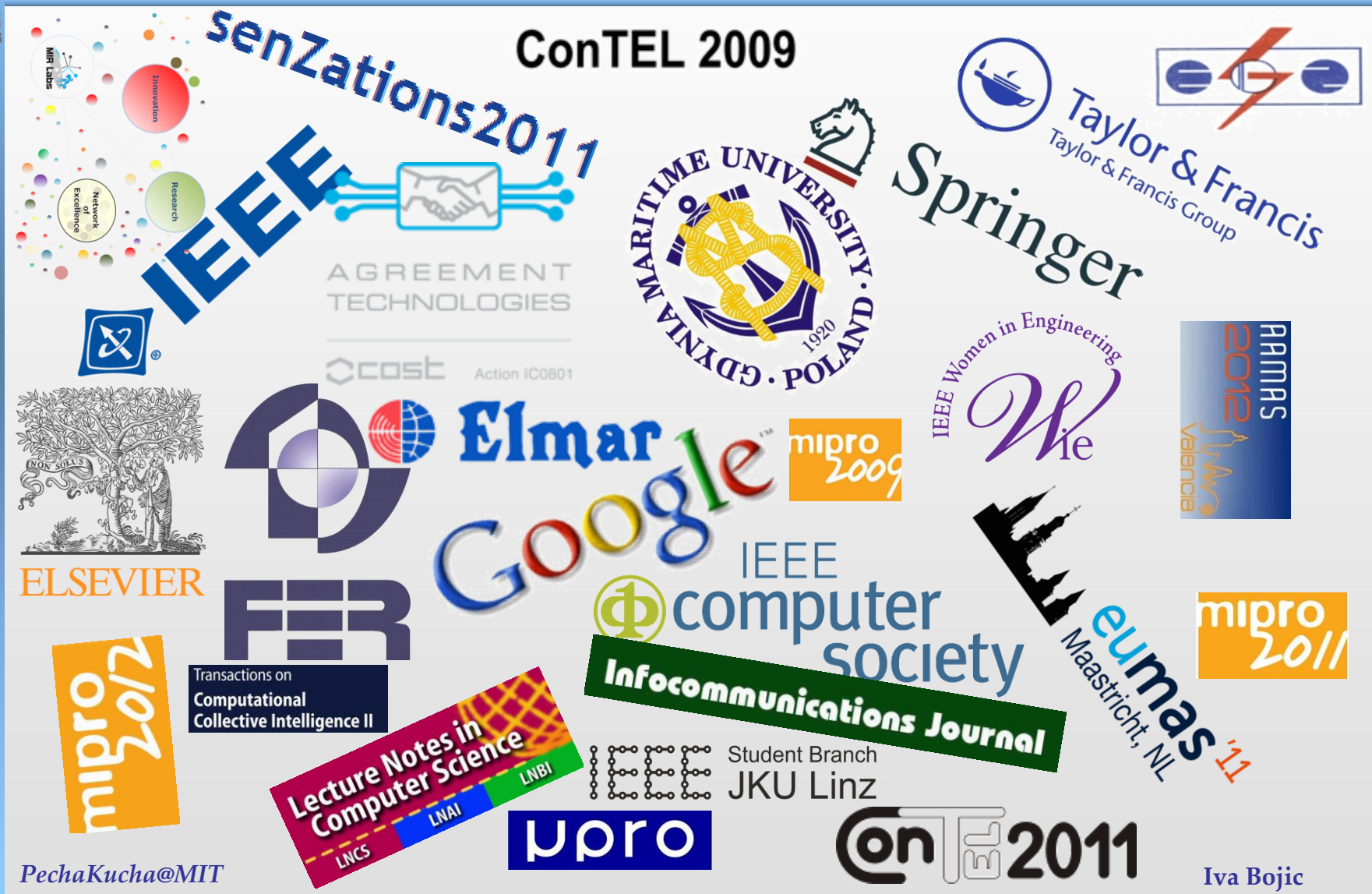
# Will machines synchronously eat each other or us?

# Me


eSTUDENT
WSC
sastavi_tim
sastavi_ideju
prijavi_na_WSC
NAGRADNI FOND 20,000kn
Microsoft
Iva Bojić
Organization team WSC

# Me again

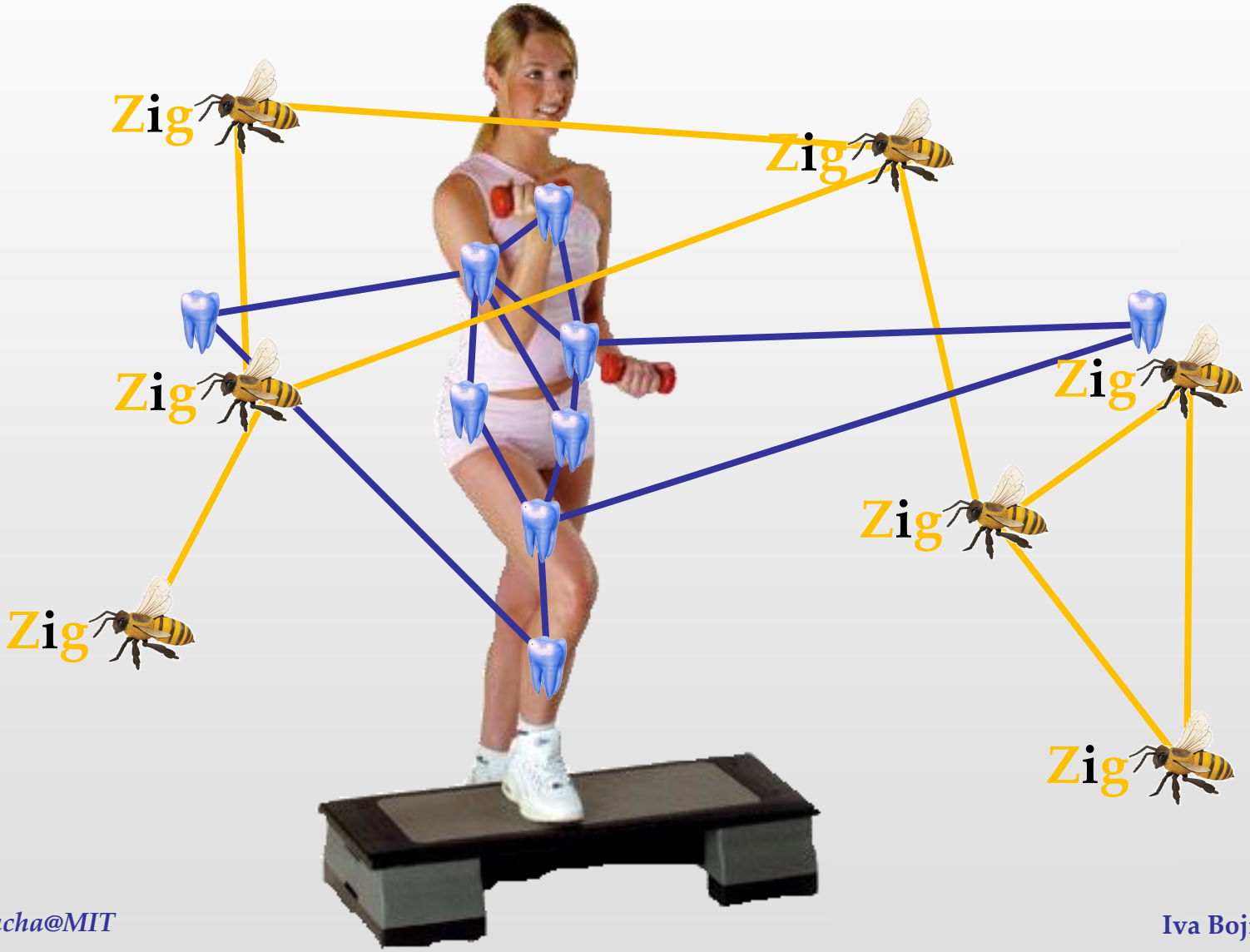

ConTEL 2009
senZations2011
IEEE
AGREEMENT TECHNOLOGIES
cost
Action IC0801
GDYNIA MARITIME UNIVERSITY · POLAND · 1920
Springer
Taylor & Francis
Taylor & Francis Group
IEEE Women in Engineering
WIE
AAMAS 2012 Valencia
Elmar
Google
mipro 2009
ELSEVIER
FER
IEEE computer society
Infocommunications Journal
eurmas '11 Maastricht, NL
mipro 2011
mipro 2012
Transactions on Computational Collective Intelligence II
Lecture Notes in Computer Science
LNCS
LNAI
LNBI
IEEE Student Branch JKU Linz
upro
ConTEL 2011

# Multidisciplinarity

# Machine-to-Machine (M2M) synchronization

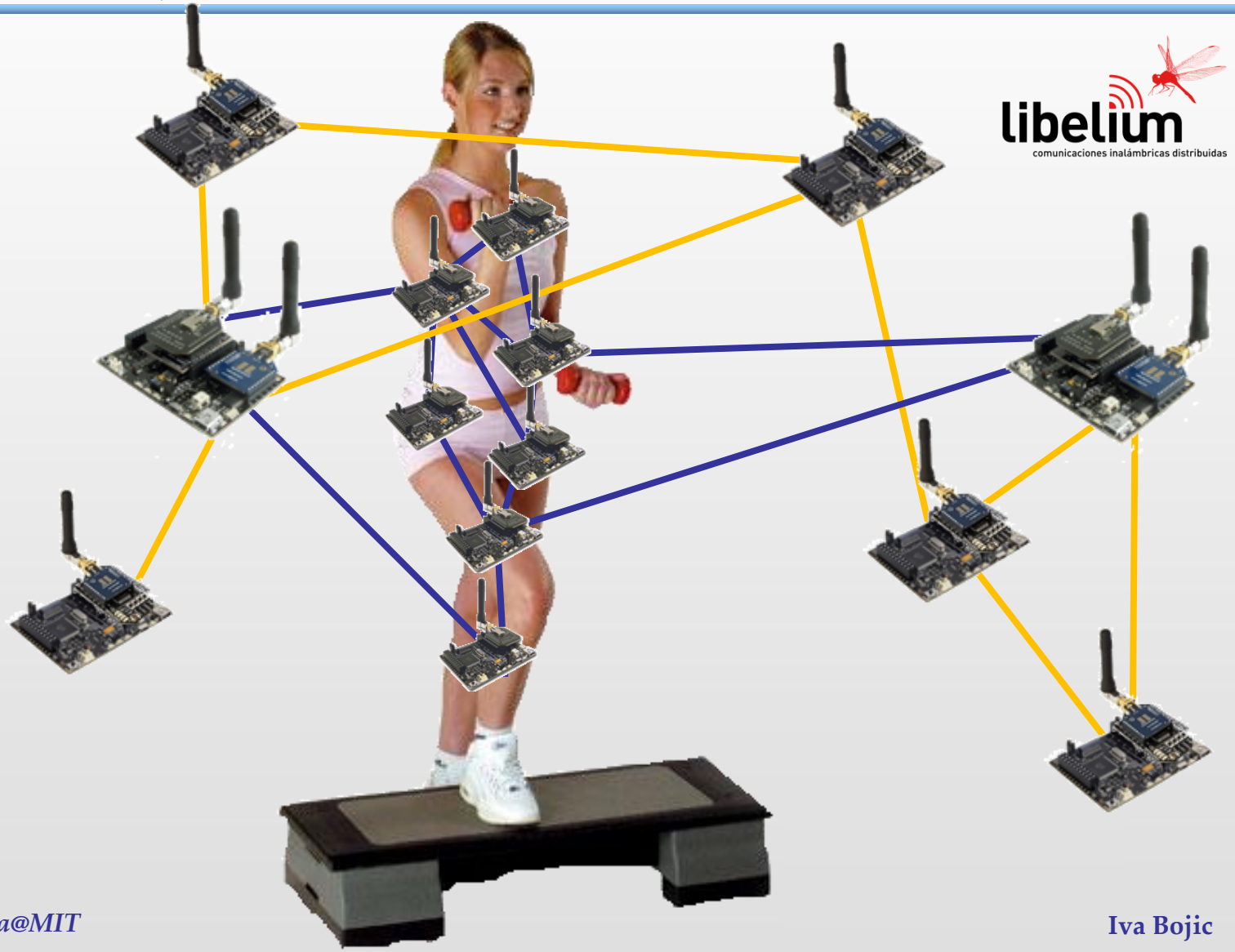
vs.

Zig



UNIVERSITY OF ZAGREB
FACULTY OF ELECTRICAL ENGINEERING AND COMPUTING

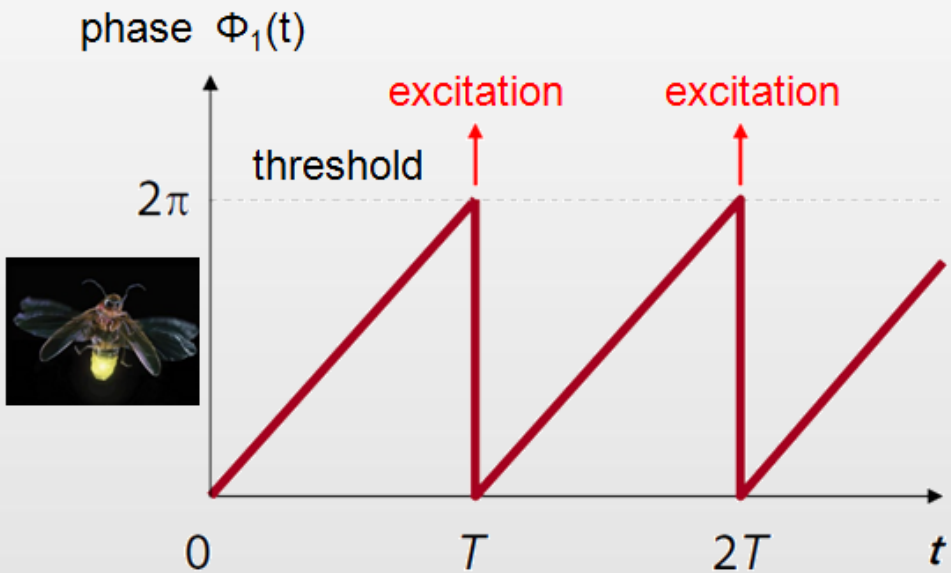
# vs. Zig

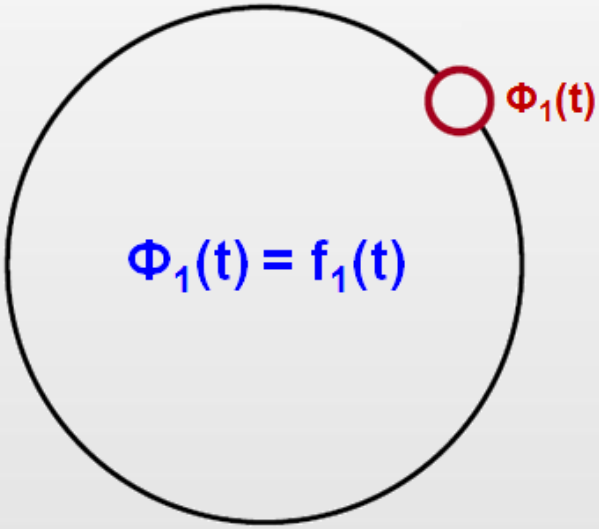


# Female *Photuris* vs. male *Photinus*

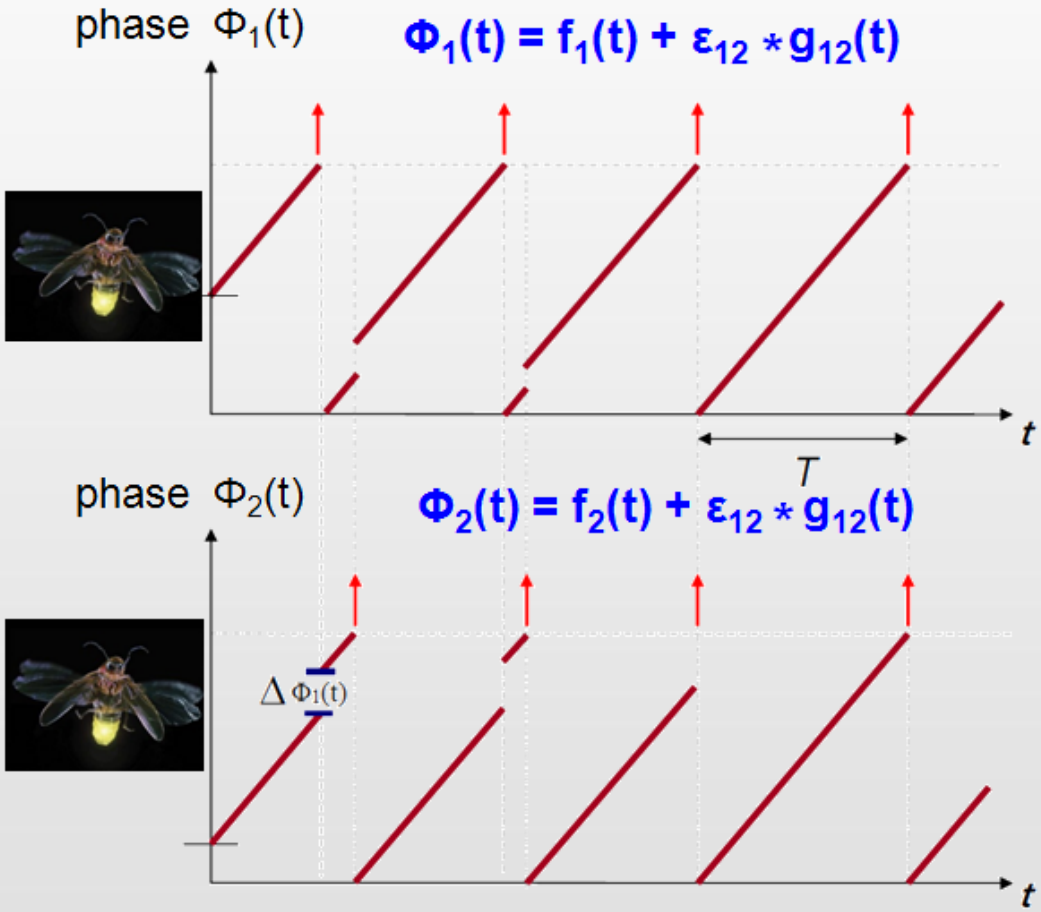
# Fireflies synchronization

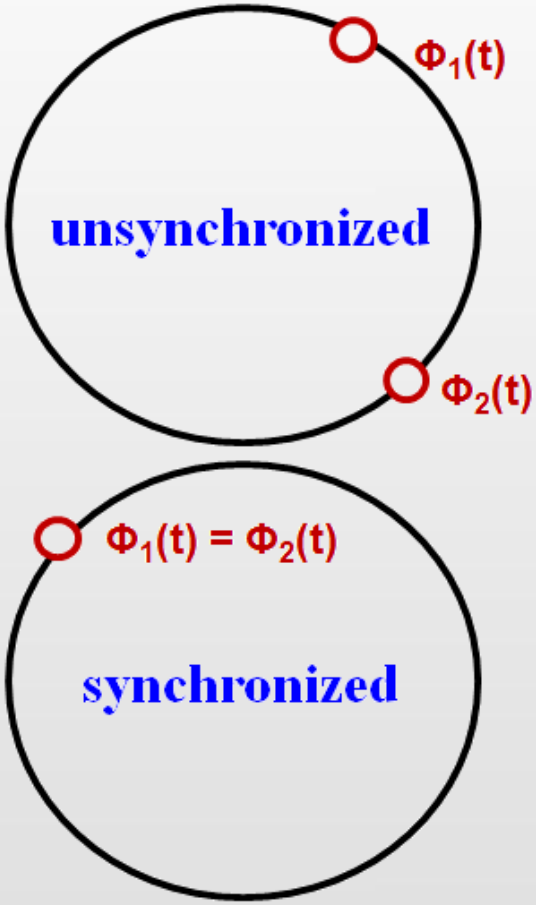
# One firefly


phase $\Phi_1(t)$
excitation
excitation
threshold
$2\pi$
0
$T$
$2T$
$t$

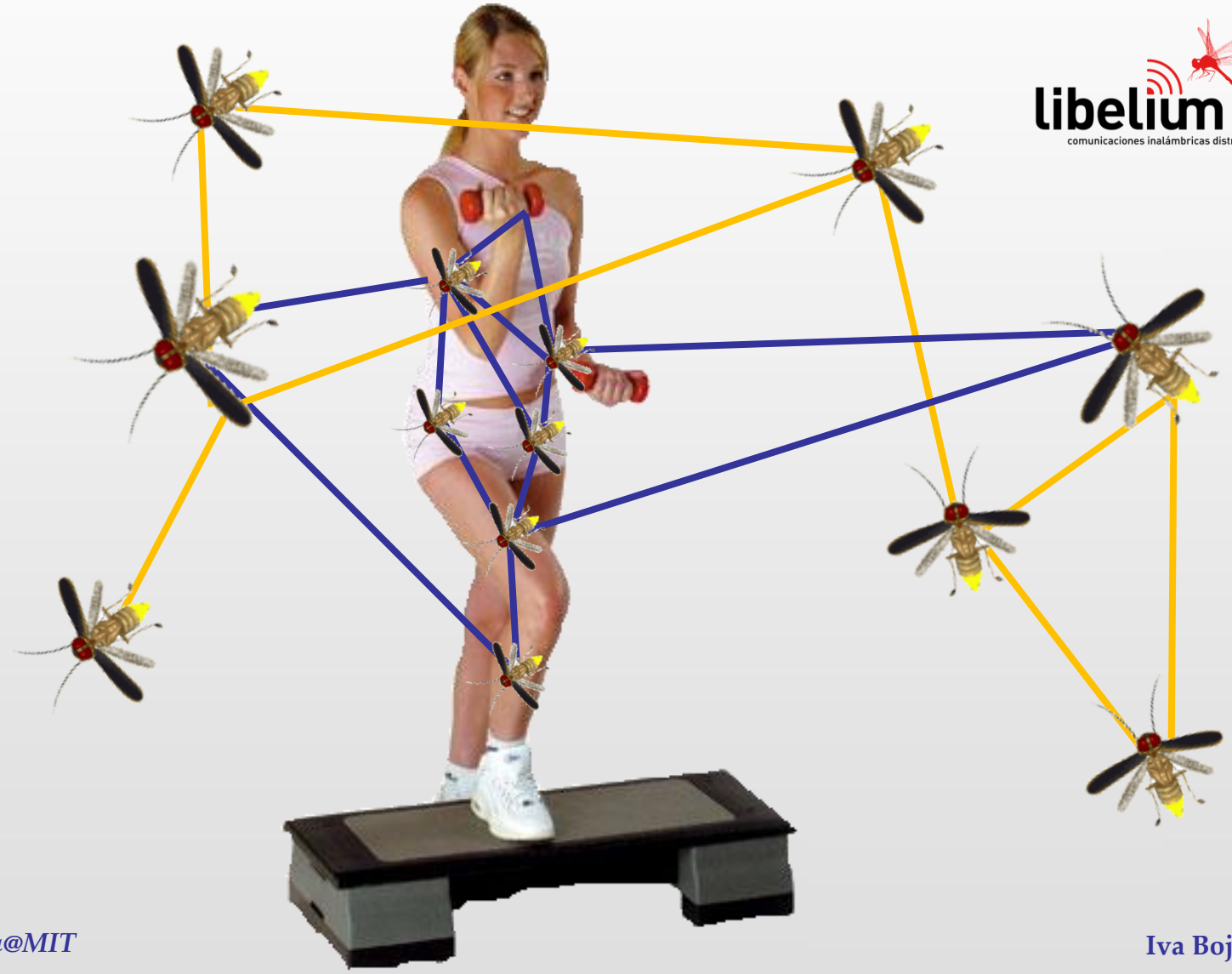

$\Phi_1(t)$
$\Phi_1(t) = f_1(t)$

# Two fireflies



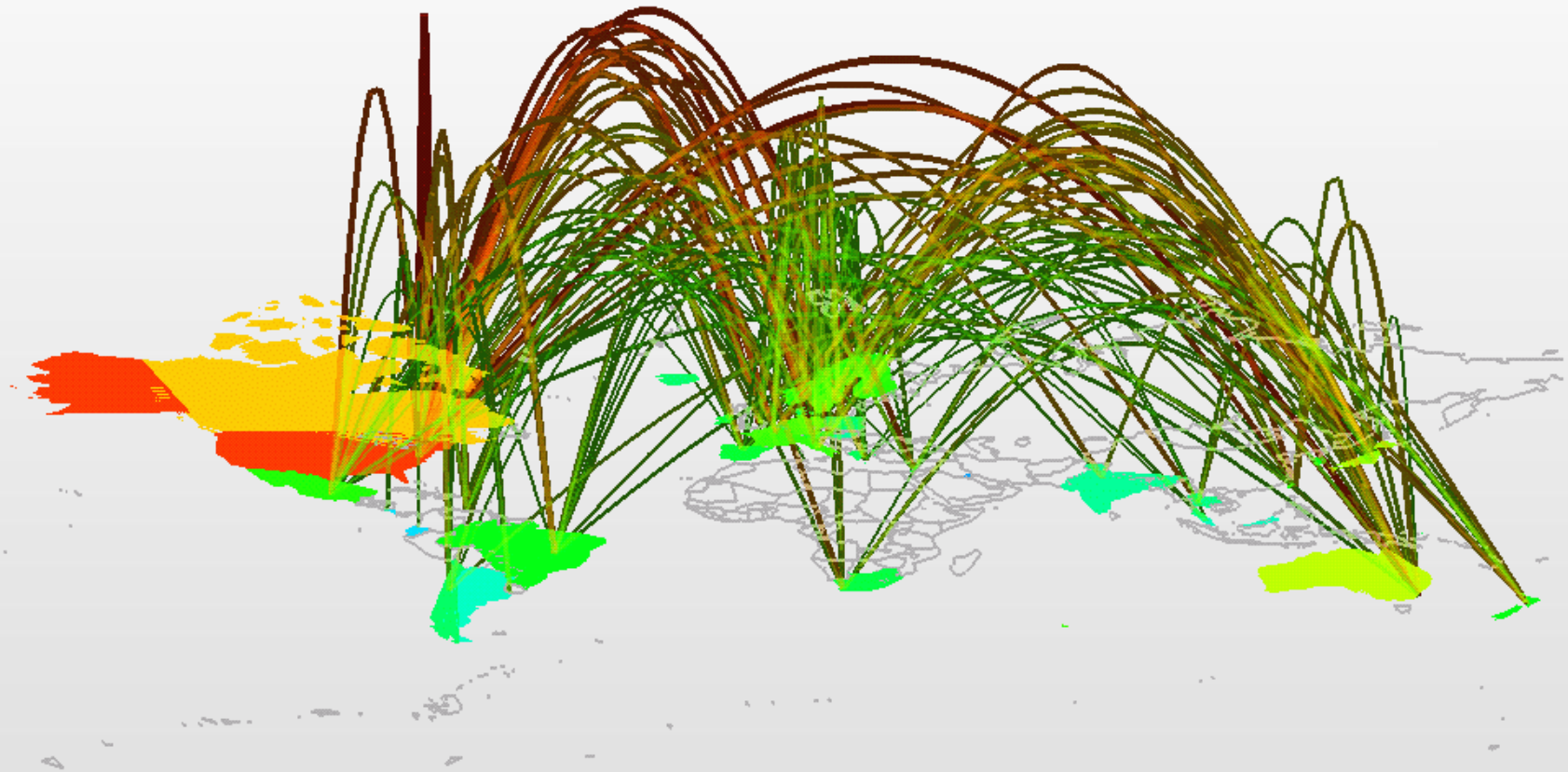
# Fireflies in Machine-to-Machine Systems



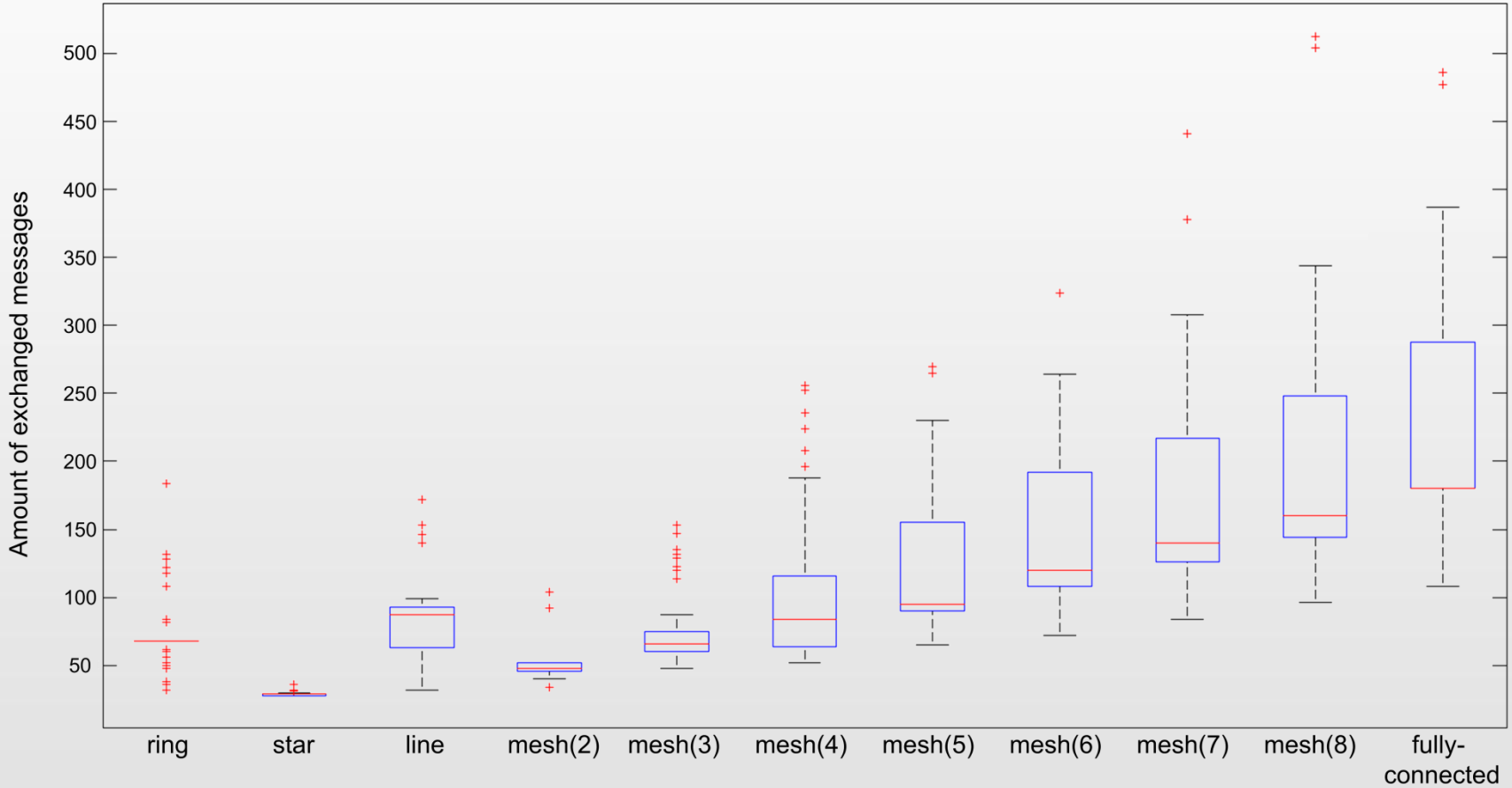


**Iva Bojic**

# Network traffic

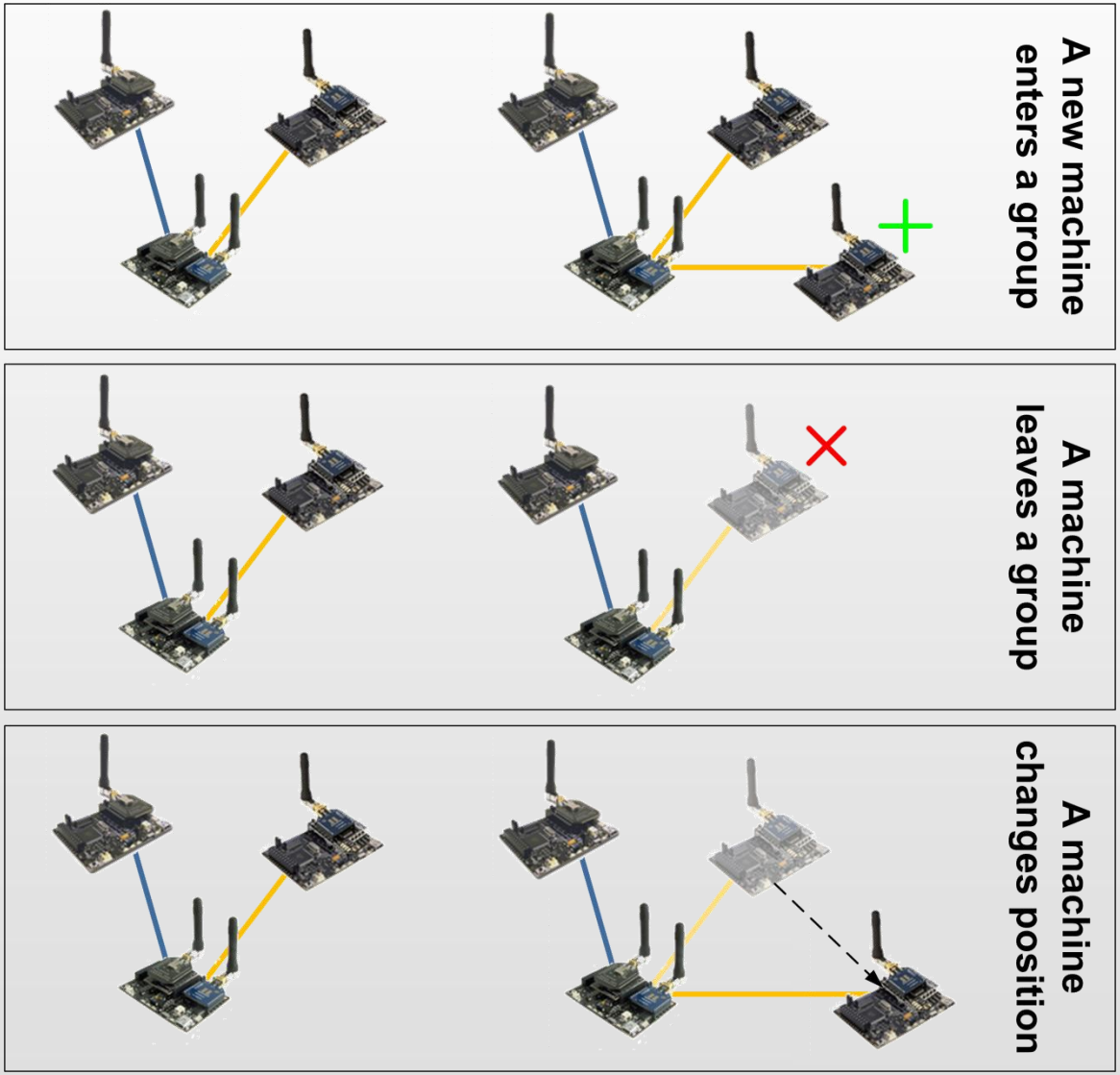


# A glance on my research results

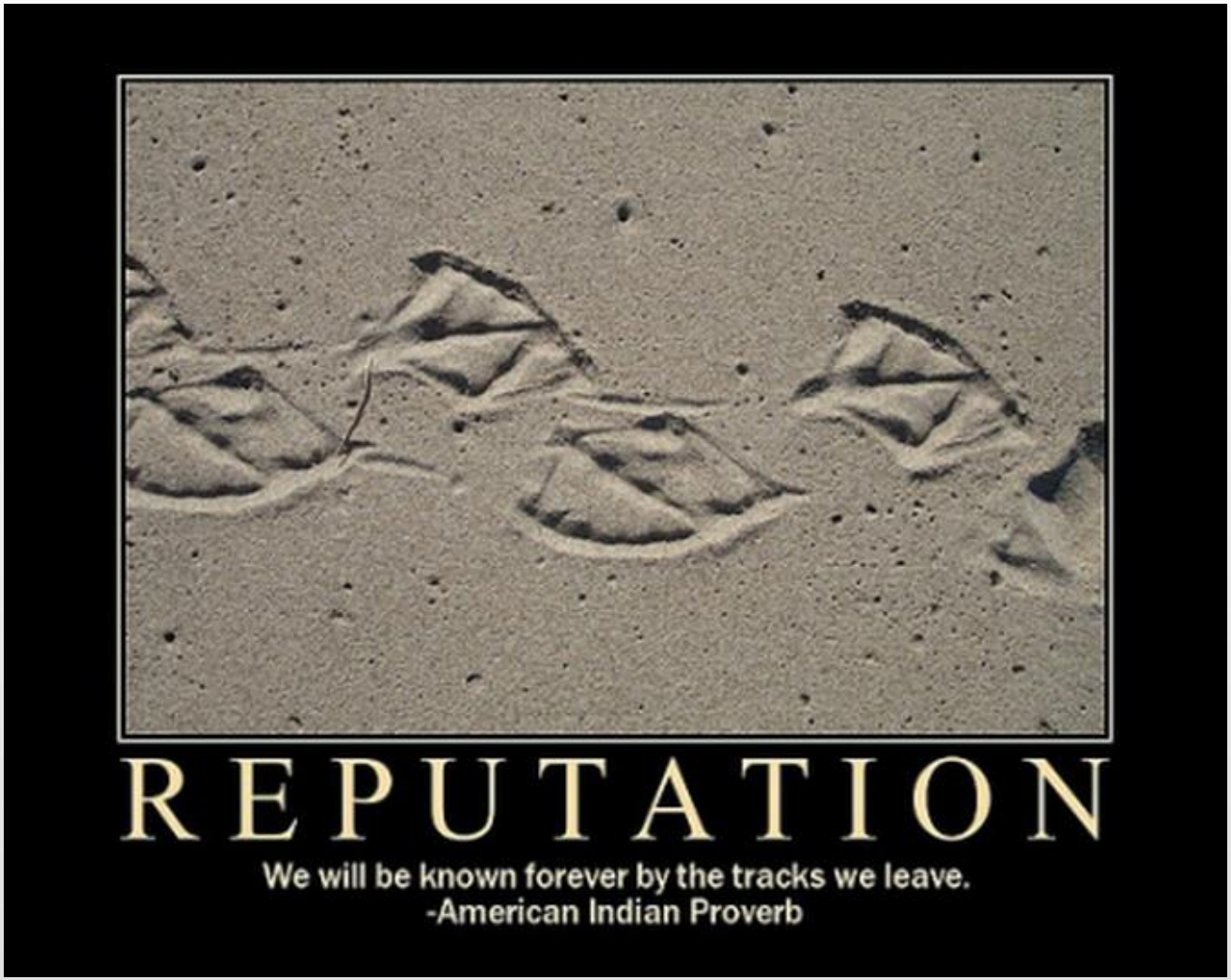



**Bojic, Iva et. al: A Self-optimizing Mobile Network: Auto-tuning the Network with Firefly-synchronized Agents. *Information Sciences*. 182 (2012), 1; 77-92.**

# Mobility

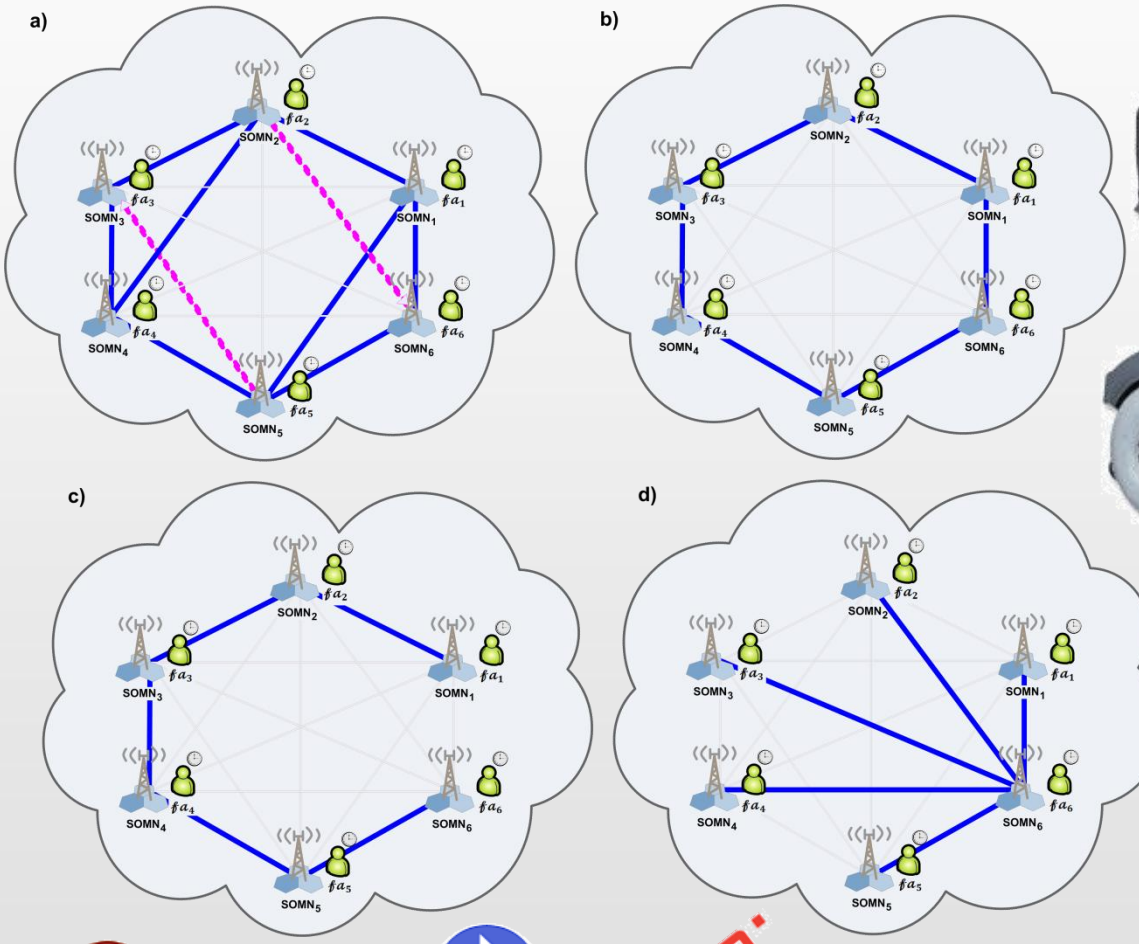

A new machine enters a group
A machine leaves a group
A machine changes position

# Robustness


REPUTATION
We will be known forever by the tracks we leave.
-American Indian Proverb

# Heterogeneous

# Summary


a)
b)
c)
d)
SOMN1
SOMN2
SOMN3
SOMN4
SOMN5
SOMN6


REPUTATION
GUARANTEED

# My selected publications

I. Bojic, "Firefly-Inspired Synchronization in Multi-Agent Systems", *Proceedings of the 11th International Conference on Autonomous Agents and Multiagent Systems*, accepted for publishing

I. Bojic and M. Kusek, "Comparing Different Overlay Topologies and Metrics in Pulse-Coupled Multi-Agent Systems", *Lecture Notes in Computer Science*, accepted for publishing

I. Bojic, T. Lipic and V. Podobnik, "Bio-inspired Clustering and Data Diffusion in Machine Social Networks", *Computational Social Networks: Mining and Visualization (Series in Computer Communications and Networks)*, London: Springer Verlag, accepted for publishing

I. Bojic, V. Podobnik, I. Ljubi, G. Jezic and M. Kusek, "A Self-optimizing Mobile Network: Auto-tuning the Network with Firefly-synchronized Agents", *Information Sciences* 182(1), 2012, pp. 77-92
(Impact Factor: 3.291)

I. Bojic and M. Kusek, "Bio-inspired Approach to Time Synchronization in Multi-Agent System", *9th European Workshop on Multi-agent Systems* (EUMAS '11), Maastricht, The Netherlands, 2011

I. Bojic and M. Kusek, "Fireflies Synchronization in Small Overlay Networks", *Proceedings of 32nd International Convention on Information and Communication Technology, Electronics and Microelectronics* (MIPRO '09), Opatija, Croatia, 2009, pp. 27-32
(awarded with *Exceptional Outstanding Paper* award)