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Innovation for
a Complex World

UNIVERSITY OF WESTMINSTER

Università degli Studi di Palermo

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UNIVERSIDAD DE SEVILLA

DLR

NLR

ComplexWorld.eu

Brussels, April 2015

SUPPORTED BY
SESAR
JOINT UNDERTAKING


ComplexWorld
Turning ideas into actions

The ComplexWorld network

Scientific network

Complexity Science

understand, model, drive and optimise
ATM behaviour and evolution

complex relationships between its different elements

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2011

White Paper

State of the art
Challenges identification
Roadmap

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A little bit of history…

White Paper → Position Paper

State of the art
Challenges identification
Roadmap

Uncertainty
Emergent behaviour
Data Science
Metrics
Resilience.

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A little bit of history…

2011 2012 2013

http://complexworld.eu/wiki

White Paper → Position Paper → CWW

A step forward…

http://complexworld.eu/wiki

White Paper → Position Paper → CWW

35	74	1500+	174000+
Contributors	Interlinked Content pages	Scientific updates	Views

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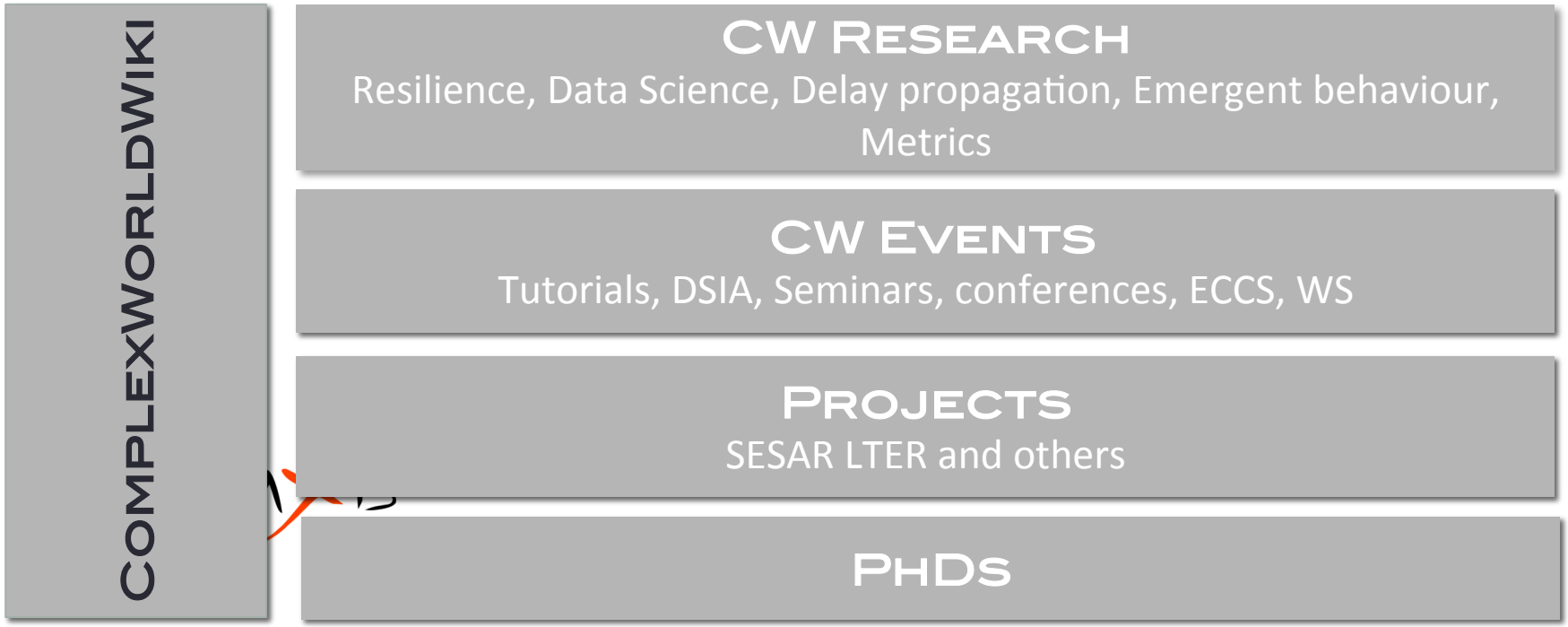
A step forward…

http://complexworld.eu/wiki



ComplexWorld.eu

2011 2012 2013 2014

Complexity Science in Air Traffic Management

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And beyond

2011 2012 2013 2014

Chapter	Book chapters	Authors(s)
0	Foreword	Andrew Cook (UoW) and Damián Rivas (US)
1	Introduction	Marc Bourgois (Eurocontrol)
2	Complex network theory	Massimiliano Zanin (INX) and Andrew Cook (UoW)
3	Complex networks in ATM	Fabrizio Lillo (UP), Salvatore Micciché (UP), Rosario N. Mantegna (UP)
4	Uncertainty	Damián Rivas (US) and Rafael Vazquez (US)
5	Resilience	Henk Blom (NLR)
6	Emergent behaviour	Henk Blom (NLR)
7	Data science	Andrew Cook (UoW) and Massimiliano Zanin (INX)
8	Conclusions and a look ahead	David Pérez (INX)

- Revolves around disruptive concepts = disruptive research lines
- Not targeting a consensual definition on complexity, but compiles core elements of complexity.

Complex Networks Theory → Air Transport system as a Complex Network.

- Excellent springboard to explore the behaviour of the system
- Generates different datasets: KDD techniques. Challenges and opportunities

A look ahead

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Data Science techniques
+
Complex networks theory
=

Huge potential to improve Air Transport performance:
punctuality, safety, capacity…
Requires: BD infrastructure, appropriate knowledge
discovery tools, availability of datasets, etc.

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A look ahead

Collaboratively addressing the challenges

www.complexworld.eu/blog

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ComplexWorld Blog

1	3	6	3	4
Launching Conference	Tutorials	Workshops (2 in Data Science)	Seminars	ECCS Satellites

17	4
Events	Years

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2011 2012 2013 2014 2015

ComplexWorld 2015 Event. 7th-8th April 2015. Brussels

Defining the challenges and opportunities for complexity and Data Science in the Air Transport field.

For the 2015 event, ComplexWorld has decided to give the word to those who achieved significant research progress during last years as a way to leverage on existing results to help identify the challenges and opportunities for future Long Term and Exploratory research in the years to come. Additionally, following to the success of the two previous editions of the Data Science in Aviation Workshop, we are also using this event to bring experts on the Data Science field, who will provide out-of-the-box perspectives on how data-driven research can contribute to a paradigm shift in air transport management.

2015Home | 2015 Agenda | 2015Venue | REGISTER HERE! | Data Science in Aviation | 2014Event | 2014Speakers | 2013Event | 2013Speakers

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Data Science in Aviation WS

Challenges

That complexity science has been tasked to tackle

Identification

External assessment

Key achievements

Future opportunities and challenges

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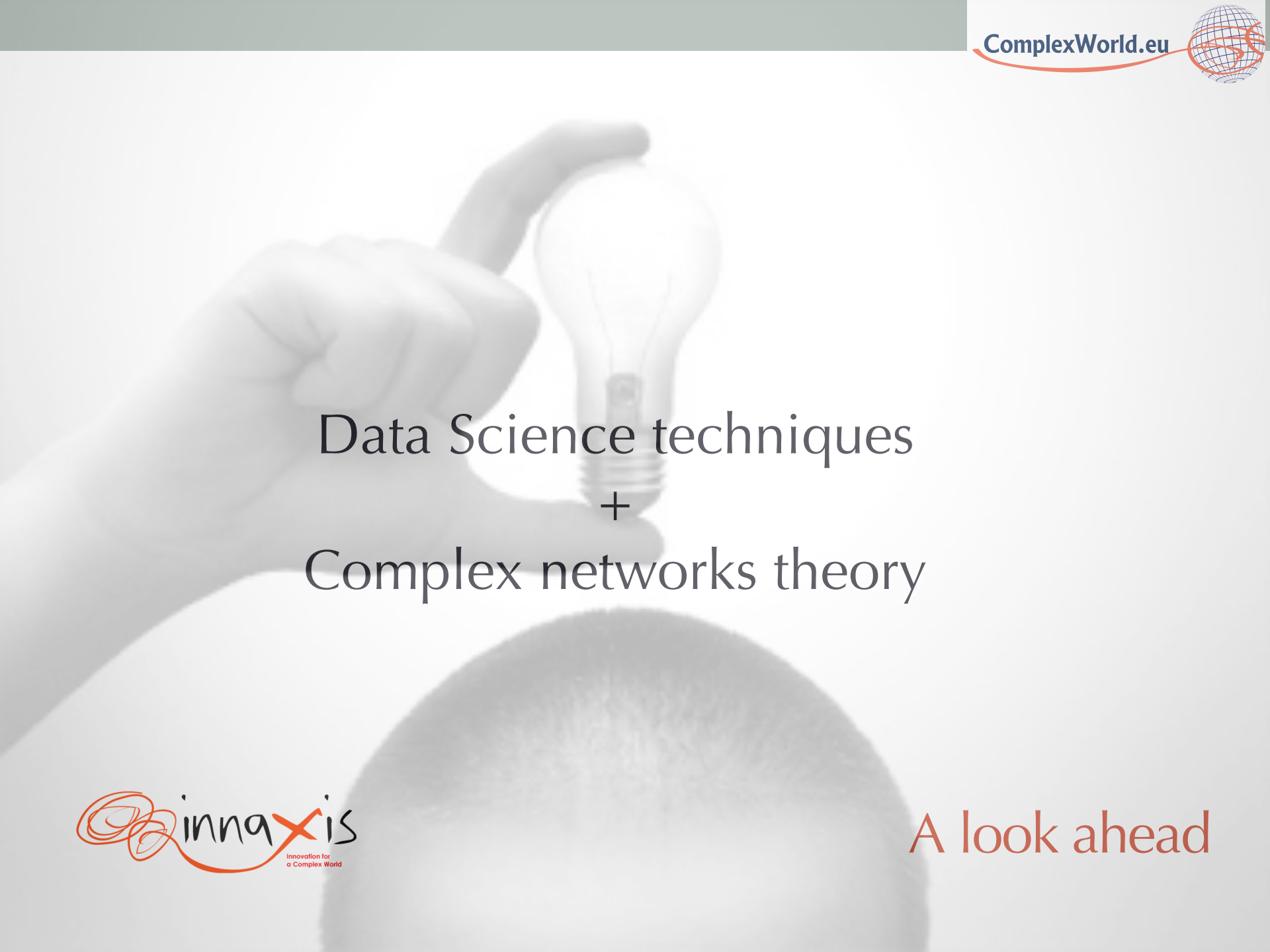
Facing the future with new ideas



Data Science techniques
+
Complex networks theory

A look ahead

We will be waiting for you at:

http://wiki.complexworld.eu

www.innaxis.org

Thank you!

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