


Welcome to Web Science: What's It All About?

Dr Leslie Carr

3rd October 2011

Why Web Science Matters



The Web has become an essential part of humanity

an essential part of the current and future economy, science and technology

- *Understanding the Web is a challenge as big as any other global cause*

Why Web Science Matters

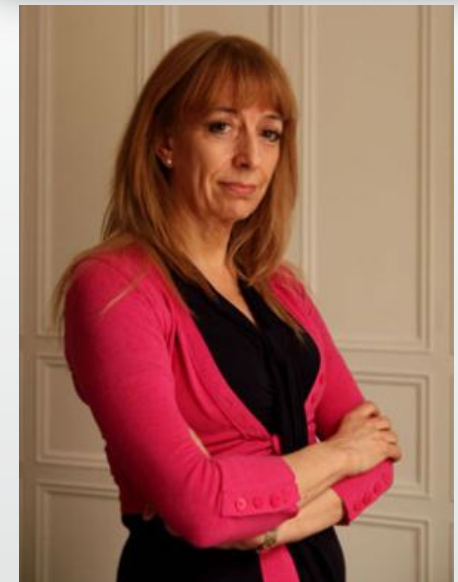
Is the Web making us weird?

THE SHALLOWS

How the internet is changing the way we think, read and remember



NICHOLAS CARR



Web Science at Southampton



- Web & Internet Science Research Group
- 20 Faculty Members
- Doctoral Training Centre
- Research areas include
 - OA, OER, OD, OGD
 - Semantic Web
 - Memories for Life
 - Trust, privacy and provenance
 - Learning & education



Web Science Beyond Technology

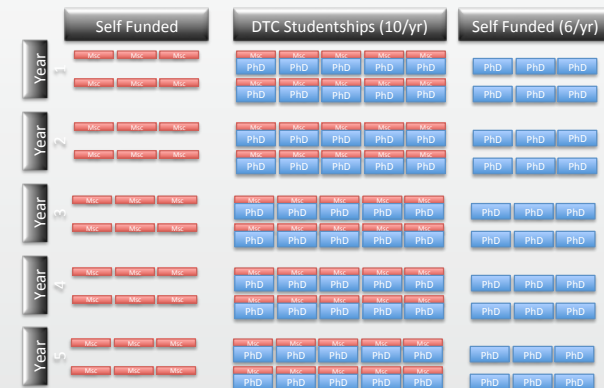


- Health Sciences
- Sociology
- Archaeology
- Criminology
- Psychology
- Law
- Maths
- Management
- Linguistics

Doctoral Training Centre



- Create a cohort of web scientists
 - Leaders and advisors in the UK's Digital Economy
 - £6 million over 8 years for 50 students
 - Funded by RCUK's £250 million DE programme*
 - rcukdigitaleconomy.org.uk
- Promote a deep understanding of the Web in society
- Carry out significant research
 - analytical, practical & constructive
 - forming a hub for research investment



*A Research Councils UK cross council initiative led by EPSRC and contributed to by AHRC, ESRC, and MRC

DTC Students 2011



Taught Curriculum (MSc / First Year iPhD)

Summer Project & Dissertation

COMP6029

5. Research project (33%)

Research Methods

COMP6049

Research Design

COMP6043

4. Performing research (11%)

Computational

Thinking

COMP6046

Disciplinary

Studies

COMP6044

Interdisciplinary

Studies

COMP6048

3. Multi-disciplinarity (17%)

Hypertext

Web 1.0

COMP6045

Social Web

Web 2.0

COMP6052

Semantic Web

Web 3.0

COMP6050

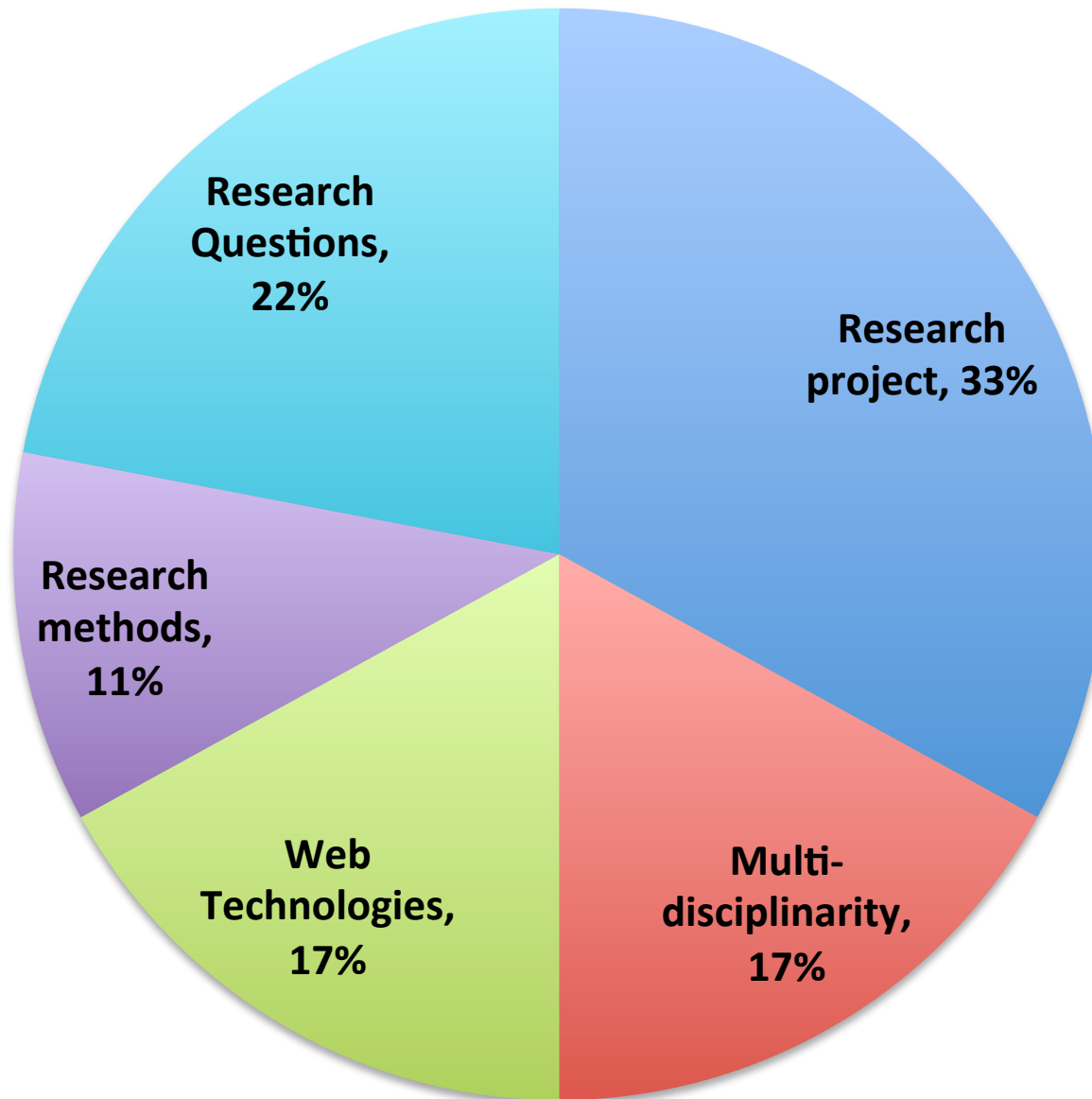
2. Web Technologies (17%)

Foundations of Web Science

COMP6037 & COMP6047

1. Web Science Issues (22%)

Taught Curriculum (MSc / First Year iPhD)



MSc Outcomes

UNIVERSITY OF SOUTHAMPTON

COMP6047W1

SEMESTER 2 EXAMINATIONS 2010/11

FURTHER WEB SCIENCE

Duration 180 mins

This exam is based on a report to which you have been given prior access.

This exam is conducted at a computer workstation. You will have access to all the course notes and the Web. Any collaboration through email, social networking, file sharing or similar is strictly forbidden.

1. Please refer to the report entitled "Directgov 2010 and Beyond: Revolution Not Evolution" that makes recommendations for the future of the UK Government's use of the Web.

You have been asked to brief a new Minister for Care Services (whose portfolio includes Adult Social Care, Mental Health, Physical Disabilities and Learning Disabilities) on the implications of these recommendations.

- a. From a multidisciplinary range of sources assemble and comment on relevant material that will form the evidence base for your briefing. Briefly critique each source in terms of quality and provenance. (20 marks)
- b. Create a comprehensive, impartial list of the pros, cons and issues for the department in terms of implementing the proposals. (30 marks)
- c. Write a briefing document for the minister, explaining the key issues for consideration. (Marks will be allocated for a well presented argument that integrates a range of evidence to




14th October 2010

Dear Francis Maude,

DIRECTGOV 2010 AND BEYOND: REVOLUTION NOT EVOLUTION

You asked me to oversee a strategic review of Directgov and to report to you by the end of September. I have undertaken this review in the context of my wider remit as UK Digital Champion which includes offering advice on "how efficiencies can best be realised through the online delivery of public services." This means that I have not reviewed Directgov in isolation but as part of how the government can use the Internet both to communicate and interact better with citizens and to deliver significant efficiency savings from channel shift. This letter sets out my findings and key recommendations.





Directgov as an organisation does two different things. It **provides access to online transactional services** such as student loans, car tax and Jobseekers' Allowance, and it **publishes government information** for citizens in one place



Hello

I co-founded Lastminute.com back in the early days of internet commerce and now I am the UK's Digital Champion attempting to get the 9m people who have never used the internet online. I co-founded Lucky Voice and Antigone I am also a non-exec director at M&S, C4 and Mydeco.com. Thanks for coming to my site and I hope you find it useful.

[View Martha's CV](#)





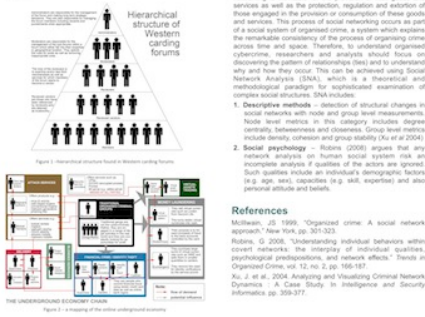
Welcome to the Web Science DTC

Social Network Analysis as a tool to study organised cybercrime

Michael Yip
School of Engineering and Computer Science
University of Southampton

Introduction
Last year I carried out an investigation on Chinese cybercrime. In particular my objective was to find out the structure of the network of individuals and organisations involved in the West. Note for my PhD, it is my intention to build on the existing knowledge to understand the structure and differences in the network structure behind cybercrime. Social network analysis is proposed as an appropriate tool for this purpose.

Summary on previous findings
From my project, I found that not only do organised cybercriminals exist in China but also a sophisticated underground economy is flourishing globally. It has been reported by Chinese security agencies that the potential worth of the Chinese underground economy would soon reach \$140 billion (US \$145 billion). Furthermore, it was found that the Chinese cybercriminals were already applying trading on online forums and much preferred using publicly accessible communication services such as Facebook and Tencent QQ and WeChat Messenger. This is in direct contrast to their Western counterparts who prefer the closed, hierarchical management forums.



Can Our Knowledge of Social Networks and the Human Immune System Help to Develop Network Security?

Simon Heame
simh10@ecs.soton.ac.uk

Introduction
Understanding the functionality of the human immune system has long inspired an operationalised model for network security. The immune system has been used to model network security, with the immune system being used to detect and respond to threats.

Immune Detection Systems
In traditional computer systems, immune detection systems (IDS) monitor network traffic for anomalies and respond accordingly. The analogy with immune system is that the network traffic is treated as a body of cells, and the IDS as a body of immune cells.

Distributed Immune Detection Systems
Distributed immune detection systems (DIDS) consist of multiple hosts within a network. Each host acts as a sensor, and the network as a body of cells. The DIDS can detect and respond to threats across the network.

Agent-Based IDS
Agent-based IDS (AIDS) use intelligent agents to monitor network traffic. The agents can move around the network, and detect and respond to threats. This is similar to the way that immune cells move around the body, and detect and respond to threats.

Privacy Challenges on the World Wide Web: An Interdisciplinary Approach

Aristea - Maria Zafiroglou
azafirogl@ecs.soton.ac.uk
FADP - In Web Science

Historical Overview of Privacy
"The right to be let alone"
Privacy - a personal and subjective concept (O'Brien, 1982)
From the personal files stored on web servers
From Facebook's practices to the latest forms of surveillance (V. A. Stross)

User Perceptions of Privacy
The Value of Privacy
Privacy is a sense of control and ability (Gutman et al., 1995)
Mental privacy settings on web sites
How much privacy settings on web sites (Bridgman et al., 2005)
The privacy paradox: Marginal utility, privacy trade-offs, and privacy (Whitt, 2010)

Privacy and Identity in Online Communities
Problems: Social networking sites do not offer users sufficient privacy protection
Social Approaches
Technical Approaches

My PhD Research
Study online privacy and its potential means of protection through an interdisciplinary approach
By combining technical with social approaches

World Wide Web Foundation

World Wide Web Foundation
www.foundation.org/vision

Software Development methodologies that better fit a more wider societal issues
I think we have a duty to make sure that [the Web] will develop in a way that is stable and pro-human
- Jim Berners-Lee, Web Developer

How We Design the Web Now

How we design the web now
Then let it out in the world...



How We Will Close the Reality Gap
The web is not a thing, acting alone. Computers cause nothing, but humans and computers together remake worlds, paraphrasing Donna Haraway, Social Theorist

Co-evolution of Web Users and Networks

Connor McCabe, Richard Watson, Jane Prichard, Wendy Hall

Adaptive networks
An adaptive network is one in which the network of links can change adaptively with respect to its state, resulting in a dynamic interplay between the state and topology of the network. This co-evolutionary cycle can occur in adaptive networks.

Complex Network Topologies
Certain topologies are typical of the networks on the Web. These complex, regular topologies include small world networks, scale-free networks, and hierarchical networks. Investigating how state changes would affect these topologies is an important step towards understanding their temporal evolution.

Computer Modeling
Some of the work conducted thus far uses computer models to test theories of how local behavioural dynamics affects the global system dynamics.

Present and future work

An investigation of users on Twitter and other social networks construct their own web of connections and how these adapt over time.

Current Topics

Privacy Concerns within Social Networking Sites

Background
Personal Information
References

Conclusion
Using social networking sites more and more often is a trend that we can't ignore. People use these sites to connect with friends, family, and colleagues. However, this convenience comes at a cost. These sites collect vast amounts of personal information, which can be used for targeted advertising, but also for surveillance and identity theft.

Blogging on the job: The Consequences of Employee Blogging for Employers

Simon Heame
University of Southampton, Faculty of Law & Business
United Kingdom
shh10@ecs.soton.ac.uk
07825161401

Introduction
Blogging poses a number of problems for employers and employees alike. Already there have been numerous cases of employees being dismissed and disciplined for their blogging activities. Employees have been caught of guard by claims of unfair and constructive dismissal. As a result, developing a greater understanding of the consequences of employees blogging is crucial.

Cases
Conthernes Sanderson - Employees took the view that their blog post brought her employment into disrepute and summarily dismissed her. The ET concluded that she had been unfairly dismissed as she had been provided with no guidance by her employers and awarded £30,000.

Legal Issues
Harassment
Making Confidential Information Discernible
Defamation
Restrictive Implied Terms
Invasion of Privacy

Conclusion & Future Research
While it is clear that employees should not be held liable for their blog posts, it is also clear that employers should have a duty to ensure that their policies and procedures are up to date and that they are aware of the risks of employee blogging.

Novel Reintermediation in the B2C Value Chain

Russell Newman
rjn2@ecs.soton.ac.uk
WebScience DTC

Value chains became a significant study in the 1970s, as the practice of cost-cutting business processes became popular. This re-modelled many businesses into more complex chains of supply. To their advantage, many businesses found that using service or supply companies dedicated to a particular function led to improved quality and lower unit prices.

However, this came at a cost: a business in the chain is dependent upon all those before it. Managing this risk can be difficult, requiring frequent monitoring. A firm within the chain has great flexibility and bargaining potential for the procurement of goods and services. This may reveal potential contingency arrangements and/or more beneficial procurement options.

Since the 90s, the Web has been re-shaping the activities and habits of players within value chains. The potential for a direct selling between a producer and consumer has profound consequences for intermediaries later in the chain. Consumers gain the illusion of lower prices due to the removal of 'middle-men'. Dell subscribes to this philosophy.

However, this leaves a vacuum in the chain, however disintermediation has occurred, the potential for novel reintermediation has emerged. This may be because the old intermediaries that became obsolete. For instance, Dell's sales are influenced by many intermediaries and intermediaries such as review websites, blog posts and myriad social media. Intermediaries typically like to monetize their activities indirectly, taking no share of a sold item. They are not web directly with the producer.

Software agents have been written to automate processes between value chain partners. Due to disparities in data formats, they have enjoyed little success. Nevertheless, many companies are able to extract information from value chain partners, although with little automated intelligent application of the data [1].

Now consider intermediaries and intermediaries that expose Linked Data about their offerings. The potential for creating reliable agents suddenly becomes viable. Furthermore, a well-designed agent may automatically identify and evaluate new options within a chain, provided data is captured properly.

Bringing about this publication of data is not going to be easy. Research shows that the decision makers typically stereotype industry peers as either 100% computer or 100% partner [2].

WEB SCIENCE PHD RESEARCH AREA

m o r a l - r i g h t s s e m i n a r

P R O V E N A N C E

u s i n g N E T I C - c o p y r i g h t - l a w

Laura German LLB (Hons) MSc (Dist.)
German of the Arts Research Student (2011)
www.ecs.soton.ac.uk

Case Study

An investigation into Chinese cybercrime and the underground economy in comparison with the West

Michael Yip
02 November 2010



- MSc summer project with SOCA (UK's Serious Organised Crime Agency)
 - How do patterns of online criminal activity in China deviate from those in known regions (EU, US & Russia)?

- Outcomes
 - new insight for SOCA
 - distinction at MSc
 - further collaboration
 - poster presentation at recent Royal Society workshop
 - invited speaker at Cambridge Computing Labs security group
 - dissertation requested by FBI

An investigation into Chinese cybercrime and the underground economy in comparison with the West

Michael Yip
School of Engineering and Computer Science
University of Southampton

UNIVERSITY OF Southampton
School of Electronics and Computer Science

introduction

With 420 million Internet users, China has become the world's largest Internet population. Yet, the Internet penetration rate in China is only 37.5%, which means that the Chinese Internet population has the potential to triple in size in the foreseeable future. With cybercrimes transcending national boundaries, the security of the Internet in China is becoming increasingly significant to the global Internet.

Economic factors

By understanding the current state of the Chinese labour market, it is easy to understand why some have become cybercriminals. 94% of the Internet users in China have an average monthly income of less than 5,000 RMB (647£), which is less than the average weekly salary of £489 in the U.K. in 2009. The Chinese education system, just like in Russia, places strong emphasis on computing related subjects like Mathematics and Science, perhaps stemming from their common Communist preference for a polytechnic education system which stresses industriousness.

Framework of cybercrime

Not only do organised cybercrimes exist in China but also a sophisticated underground economy is flourishing rapidly. It has been estimated by Chinese security experts that the potential worth of the Chinese underground economy would soon reach 100 billion RMB (U \$1.49 billion). This is far larger than the figure reported in 2008 by Symantec who estimated the total amount of the advertised goods they observed was worth approximately US\$276 million.

Political factors – "hacktivism"

It is a popular belief in China that after suffering more than a century of national humiliation since the Opium War (1840), it is Communism which has brought the glory days back to China. Thus, the Chinese hacktivists are called the "Red hackers" (the honkers) and they are those empowered to protect their country from further political humiliation. Recently, the honkers launched cyber-attacks against Japan and by monitoring their discussion forums, several interesting observations were made including:

- The honkers showcasing their work like trophies (figure 5).
- Intervention from the Chinese government brought a stop to the attacks.
- Not all honkers agree on attacks such as website defacements.

Chinese underground economy

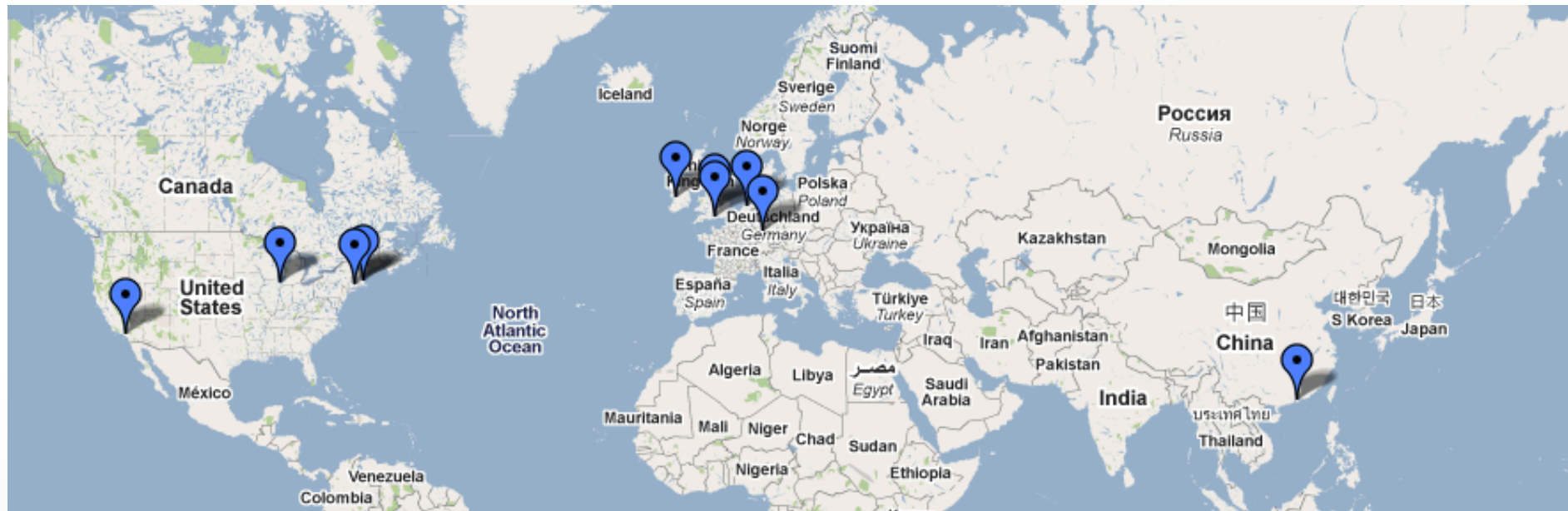
While the Western cybercriminals prefer to use online forums which commonly have a hierarchical management structure (figure 2), the Chinese cybercriminals prefer to form networks of ephemeral relationships (figure 1) using more decentralised means such as Baidu/Tieba (figure 6) and QQ Instant Messenger. Furthermore, the pricing of carding merchandise were found to be similarly priced in China and the West but services such as hacking and Denial-of-Service (DDoS) attacks are not.

Carding: the fraudulent use of third party credit card information for personal gain

Conclusion

Like in the West, organised cybercrimes are flourishing in China. With a rapidly expanding Internet population, China is fast becoming a giant hub of cybercrime activities. Therefore, it is in the interest of Western cyber

Web Science Network of Laboratories



The **Web Science Network of Laboratories (WSTNet)**

combines some of the world's leading academic researchers in Web Science, with new academic programmes that will enhance the already growing influence of Web Science. The member Labs will provide valuable support for the ongoing development of Web Science. There are ten founding WSTNet labs.

Web Science across continents

- Astronomers obtain a very high resolution picture of the sky from small telescopes a long distance apart.
- Many web labs, contributing across the globe, help build an accurate picture of human activity at planetary scale.
 - *transcending parochial social, political, economic, legal interpretations*

