

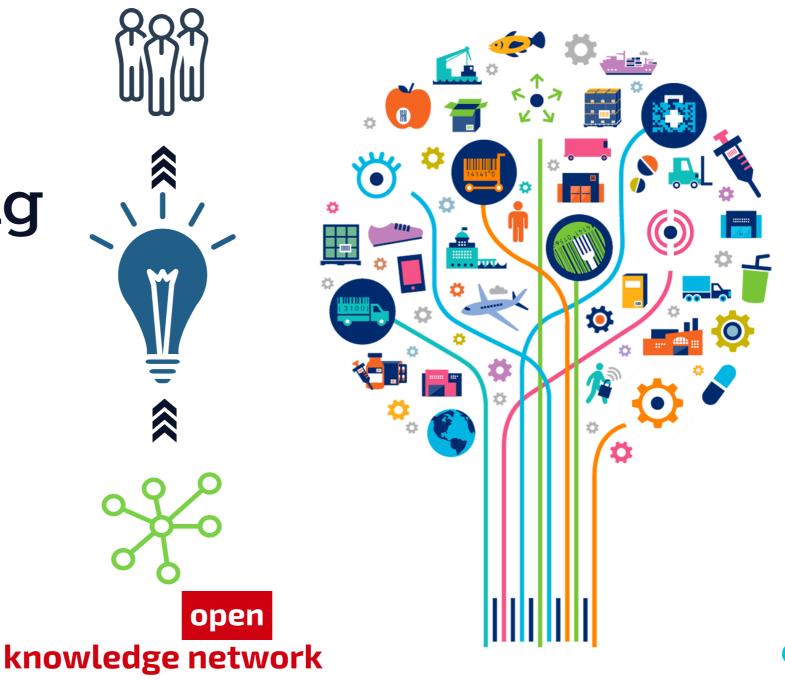
## Credible Open Knowledge Network

Team A7143 PI: Chengkai Li (UTA) Co-PIs: Dolores Albarracin (UIUC), Xiaojing Liao (Indiana), Yinghui Wu (Case Western), Jun Yang (Duke)

#### decision makers

Intelligent decision making driven by open knowledge network





### decision makers

What if an open knowledge network opens the door to lowcredibility decisions?





## **Misinformation Leads to Disastrous Decisions**

#### Fashion has a misinformation problem. That's bad for the environment.

Questionable facts plague the conversation around sustainability and fashion, and that makes the industry harder to regelated to chemical & By Alden Wicker | Updated Jan 31, 2020, 2:40pm EST materials systems (A7017)

Australia fires: Misleading maps and pictures go viral

By Georgina Rannard BBC News related to geographic information systems ③ 7 January 2 (A6677) and traffic/map information (A6884)

**Reliability of Visual Inspection for Highway Bridges** 

related to civil infrastructures (A7115)



Companies fear rise of fake news and social media rumours

Annual Kroll fraud report finds 84% of businesses feel threatened by digital hearsay

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related to business & entrepreneurship knowledge (A7153)

Man Dies, Woman Hospitalized After Taking Form Of Chloroquine To Prevent

COVID-19

related to COVID-19 sciences (A6940)



March 24, 2020 · 4:20 AM ET

#### Putting 2020 Census Rumors to Rest

**Census Partners With Social Media** Platforms, Community Organizations, the Public to Stop Spread of False Information ZACK SCHWARTZ | FEBRUARY 10 2020 related to census data (A7095)



#### related to global energy data systems (A7137)

(A7152)

GREAT ENERGY CHALLENGE

Debunking the Renewable Energy Disinformation Campaign and space science data



Fact check: New Michael Moorebacked Planet of the Humans full of errors, fundamentally misunderstands electric system

Objective: Credible Open Knowledge Network

Building framework and tools to help software developers and domain experts to ensure the credibility of their decision making software powered by knowledge graphs



credible open knowledge network

decision makers

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### decision makers

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### data-driven decision making applications





health misinformation

cybersecurity

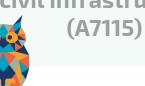


Geographic Information Systems (A6677)

chemical & materials systems (A7017)



civil infrastructure



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other applications

credible open knowledge network "**Credibility**" has both *objective* and *subjective* aspects!

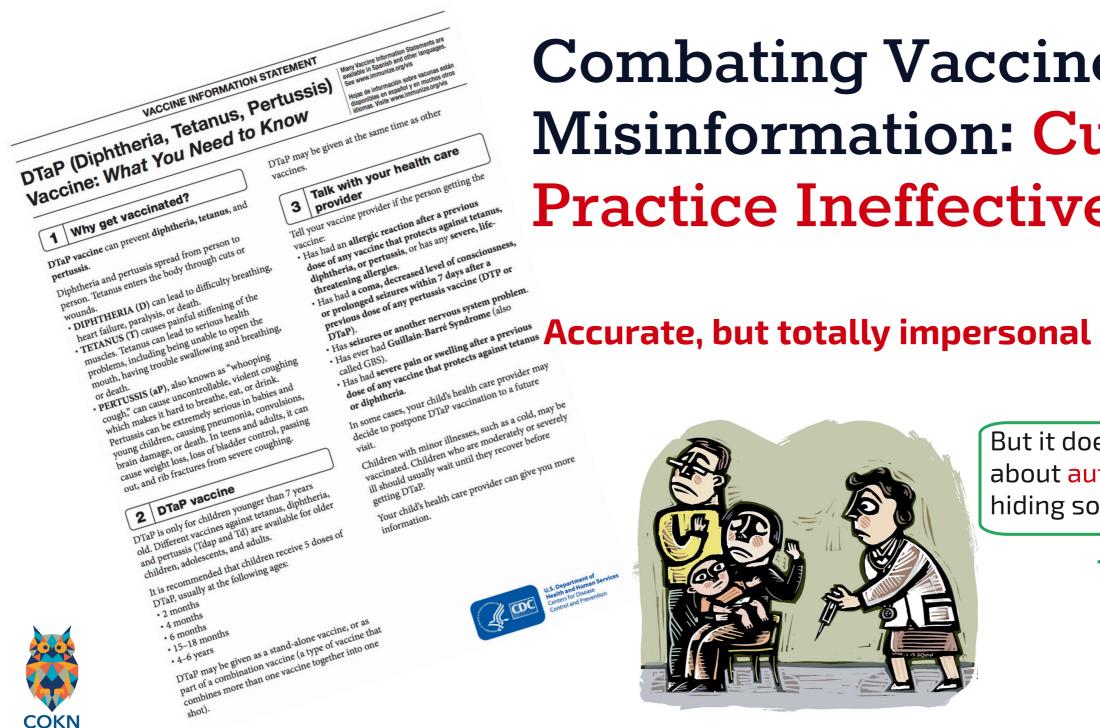
### **Broader Impact:** Vaccine Hesitancy Among Top-Ten Threats to Global Health (Source: WHO)

Deadly measles outbreak hits children in Samoa after anti-vaccine fears The Washington Post

TIME There Isn't a COVID-19 Vaccine Yet. But Some Are Already Skeptical About It







## **Combating Vaccine Misinformation:** Current **Practice Ineffective**



But it doesn't talk about autism. Are you hiding something?



#### **Punch in concerns**

Vaccines caus	e aut	
Vaccines caus	e autism?	
Vaccines caus	e autoimmune disorder	's?
)r select a co	oncern from taxon	om
	about practices	
3. Concerns	,	
	nful ingredients	
3.2. Side-		
+ 3.2.1.1 + 3.2.2.1	Disease (e.g., HPV)	
	Disability Death (e.g., SIDS)	
	Autism	
0.2.1.7	Short-term injury	
+ 4. Distrust in		
Frending	Near You	
s COVID-19 treat coagulant?	table with aspirin and	
shots caus	se false positives for CC	DVID
landemic	c" documentary credible	9?

9

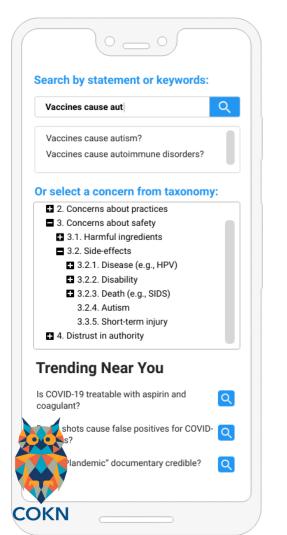
#### **Punch in concerns**

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	_
Search by statement or keywords:	Vaccines cause autism? False
Vaccines cause aut	Counter Points
Vaccines cause autism? Vaccines cause autoimmune disorders?	Andrew Wakefield, who claimed MMR caused autism, falsified data in his research
Or select a concern from taxonomy:	Read More Read M
<ul> <li>2. Concerns about practices</li> <li>3. Concerns about safety</li> <li>3.1. Harmful ingredients</li> </ul>	Research shows no link between autism and vaccines (either antigens or ingredients)
<ul> <li>3.2. Side-effects</li> <li>3.2.1. Disease (e.g., HPV)</li> </ul>	MORE HISTORY
<ul> <li>3.2.2. Disability</li> <li>3.2.3. Death (e.g., SIDS)</li> </ul>	General Resources
3.2.4. Autism	Andrew Wakefield, Wikipedia
3.3.5. Short-term injury 4. Distrust in authority	Vaccines and Autism: What You Should Know, Children's Hospital of Philadelphia
Trending Near You	Do Vaccines Cause Autism? The College of Physicians of Philadelphia
Is COVID-19 treatable with aspirin and coagulant?	Vaccines Do Not Cause Autism, CDC
shots cause false positives for COVID-	MORE PERSONALIZE
landemic" documentary credible?	
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#### **Get counter points**

#### **Punch in concerns**



### **Get counter points**

HISTORY

PERSONALIZE

General Resources

Children's Hospital of Philadelphia

Andrew Wakefield, Wikipedia

Physicians of Philadelphia

Counter Points

MORE

MORE

Vaccines cause autism? False Vaccines cause autism? False Other patient/parent concerns: 4. Distrust in authority Andrew Wakefield, who claimed MMR caused Add More from Taxonomy autism. falsified data in his research... Personalize using EPIC data: Papers suggesting links between thimerosal and Demographics autism have been retracted/discredited... Learning/language preferences Immunization history Research shows no link between autism and vaccines (either antigens or ingredients) ... Personalized Resources MMR vaccine not linked to autism, even in high-risk kids (video), Fox News < Vaccines and Autism: What You Should Know, < Do Vaccines Cause Autism? The College of < Vaccine Safety (video), VYF Vaccines Do Not Cause Autism, CDC < MORE

Pull contextual info from electronic health records and get personalized intervention resources

#### **Punch in concerns**

#### Search by statement or keywords: Vaccines cause aut Vaccines cause autism? Vaccines cause autoimmune disorders? Or select a concern from taxonomy: 2. Concerns about practices 3. Concerns about safety 3.1. Harmful ingredients 3.2. Side-effects 3.2.1. Disease (e.g., HPV) 3.2.2. Disability 3.2.3. Death (e.g., SIDS) 3.2.4. Autism 3.3.5. Short-term injury 4. Distrust in authority **Trending Near You** Is COVID-19 treatable with aspirin and Q coagulant? shots cause false positives for COVIDlandemic" documentary credible? Q COKN

### **Get counter points**

#### Pull contextual info from electronic health records and get personalized intervention resources

	0-0	
Vaccines cause autism? False	Vaccines cause autism? False	Vaccines cause autism? False
Counter Points Andrew Wakefield, who claimed MMR caused autism, falsified data in his research Read More Apers suggesting links between thimerosal ad autism have been retracted/discredited Read More MORE HISTORY	Other patient/parent concerns: <ul> <li>4. Distrust in authority</li> <li>Add More from Taxonomy</li> </ul> <li>Personalize using EPIC data: <ul> <li>Demographics</li> <li>Learning/language preferences</li> <li>Immunization history</li> </ul> </li> <li>Co</li> Personalized Resources	Other patient/parent concerns:          3.1.3. Concerns about safety: Harmful Ingredients: Aluminum adjuvant         4.2. Distrust in authority: Government/industry conspiracy/special interest         Add More from Taxonomy         Personalize using EPIC data:         Demographics         Learning/language preferences         Immunization history
Ceneral Resources   Andrew Wakefield, Wikipedia   Vaccines and Autism: What You Should Know   Children's Hospital of Philadelphia   Do Vaccines Cause Autism? The College of   Physicians of Philadelphia   Vaccines Do Not Cause Autism, CDC   MORE   PERSONALIZE	MRR vaccine not linked to autism, even in high-risk kids (video), Fox News         Image: Construction of the second sec	Go         Personalized Resources         Christopher Shaw (neroscientist), Wikipedia         Retraction Notice, Journal of Inorganic         Chemistry         Torturing more mice in the name of antivaccine pseudoscience: PubPeer versus antivaxers, David Gorsk
	MORE	MORE

### Prioritization of Cybersecurity Vulnerabilities: Current Practice One-Size-Fit-All



FORTIPHY ControlWatch Alerts	Inventory Topology Conversations LogicGuard		
Label	Vulnerabilities	Vendor	Туре
10.164.223.197	Critical 1 High 3 Medium 1	Schneider Automation, Inc.	140 CPU 651 50
10.164.223.84	Critical 3 High 4 Medium 1	Schneider Automation, Inc.	140 CPU 672 60
10.164.223.130	Critical 3 High 4 Medium 1	Schneider Automation, Inc.	(140 CPU 672 60)
COKN		urce: National bility Database	$\square$

## **Broader Impact:** Over- and Under-Reactions Due to Lack of Context may Lead to Great Financial and Human Loss

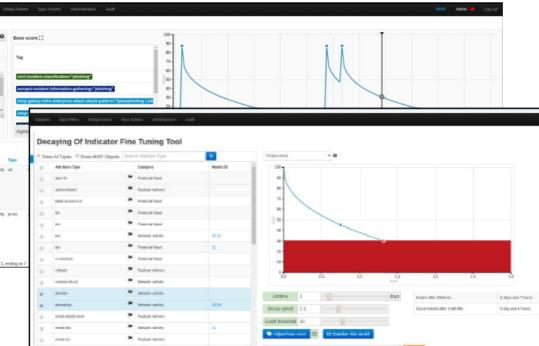
Cyber Incident Blamed for Nuclear Power Plant Shutdown A nuclear power plant in Georgia was recently forced into an emergency shutdown for 48 hours washingtonpost.com Staff Writer By Brian Krebs Thursday, June 5, 2008; 1:46 PM after a software update was installed on a single computer. COKN

# **Deliverable: Contextualized** Assessment and Prioritization Tools to be Deployed by:





Input keywords to search				
Total 74 < 1 2 3 4 5 6 7 >				
Vulnerability	NVD/Reassess \$	Cert/Reassess \$	CVSS V3.1 base \$	CVSS V3.1 rank
(ICSMA-17-215-01) Siemens Molecular Imaging Vulnerabilities	11	11	9.8	13
(ICSA-15-335-03B) Siemens Simatic Communication Processor Vulnerability (updat e B)	13	12	9,4	14
(ICSA-15-272-01) Honeywell Experion Pks Directory Traversal Vulnerability	14	13	9.4	15
ICSA-19-094-04) Rockwell Automation Stratix 5950	16	16	8.6	17
(ICSA-19-094-03) Rockwell Automation Stratix 5400/5410/5700/8000/8300 And Ar morstratix 5700	17	17	8.6	20
ICSA-19-094-03) Rockwell Automation Stratix 5400/5410/5700/8000/8300 And Ar morstratix 5700	18	18	8.6	21
ICSA-13-233-01) Siemens Comos Privilege Escalation Vulnerability	20	20	8.4	22
ICSA-13-347-01) Siemens Comos Privilege Escalation	21	21	8.4	23
ICSA-17-243-01) Siemens Discovery Service Of Opc Ua Protocol (update C)	22	22	82	24
ICSA-16-287-04) Rockwell Automation Stratix Denial-of-service And Memory Leak	25	15	8.6	16





### preliminary version at http://cvkn.pythonanywhere.com/browse

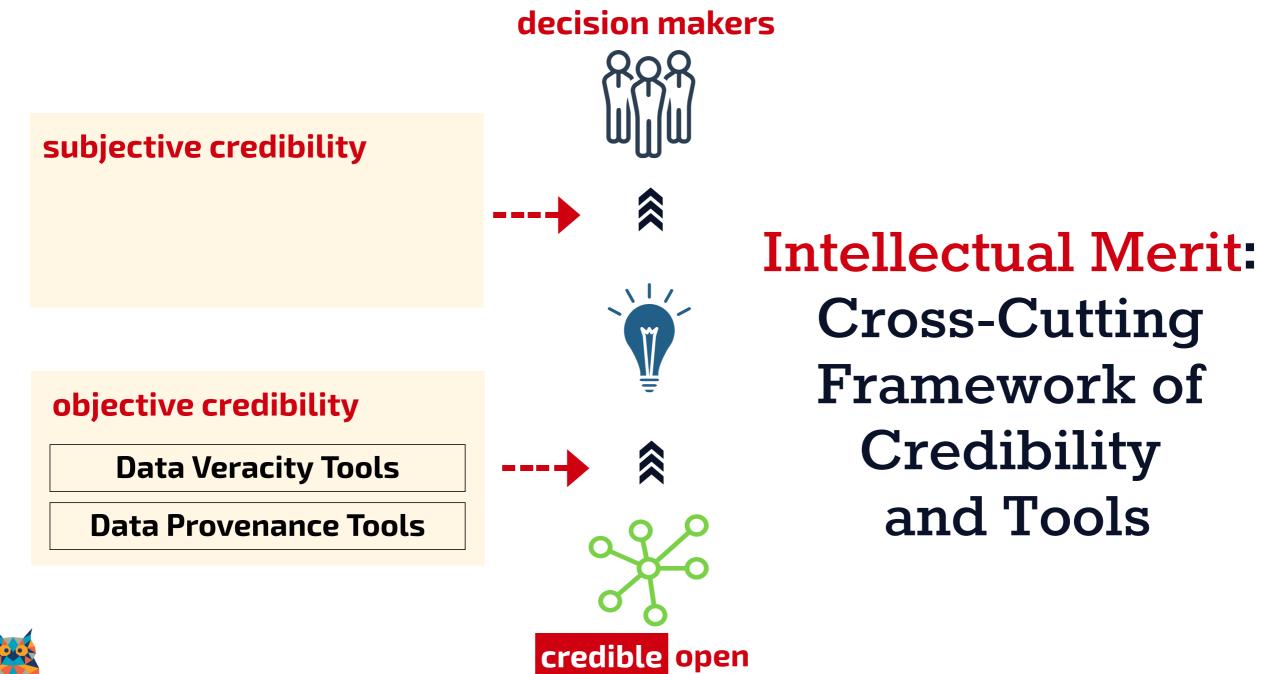
# **Deliverable: Contextualized** Assessment and **Prioritization Tools to be Deployed**

Input keywords to search

#### Total 74 < 1 2 3 4 5 6 ··· 15 >

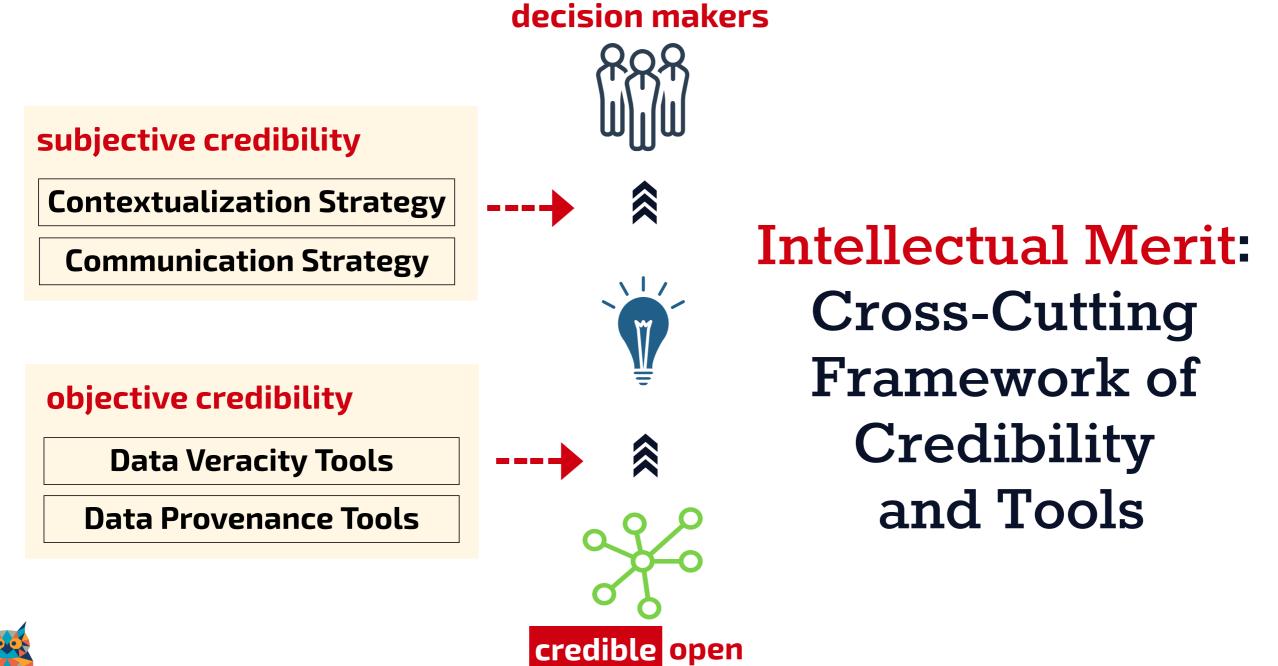
Vulnerability	NVD/Reassess 🗢	Cert/Reassess 🔶	CVSS V3.1 base 🔶	CVSS V3.1 rank 🜲
(ICSA-15-344-01B) Advantech Eki Vulnerabilities (update B)	1	1	10	1
(ICSA-15-272-01) Honeywell Experion Pks Directory Traversal Vulnerability	2	2	9.4	3
(ICSA-18-298-02) Advantech Webaccess	3	3	9.8	2
(ICSA-15-020-01) Siemens Scalance X-300/x408 Switch Family Dos Vulnerabilities	4	4	7.5	5
(ICSA-19-094-03) Rockwell Automation Stratix 5400/5410/5700/8000/8300 And Ar morstratix 5700	5	5	8.6	4





knowledge network

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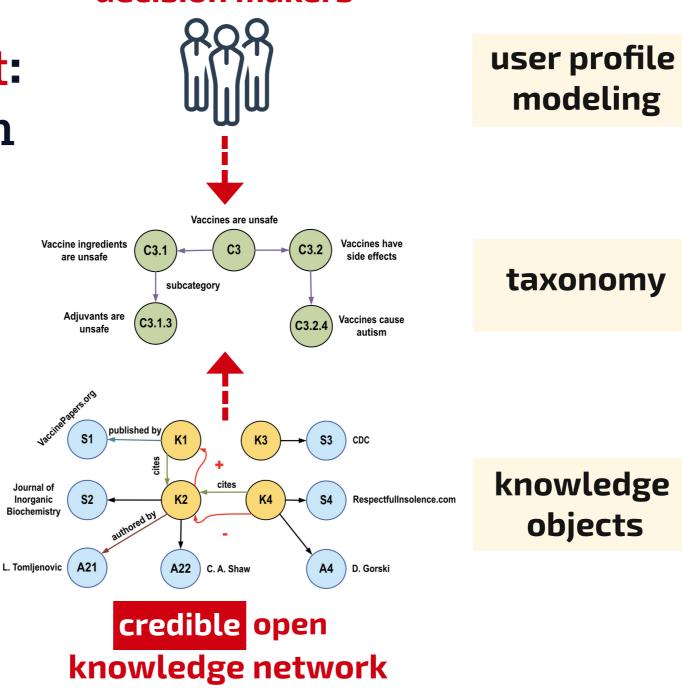


knowledge network

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#### decision makers

### Intellectual Merit: Contextualization for Subjective Credibility





### **Phase II Deliverables**



subjective credibility strategies objective credibility tools





### **Phase II Deliverables**



### **Phase II Deliverables**

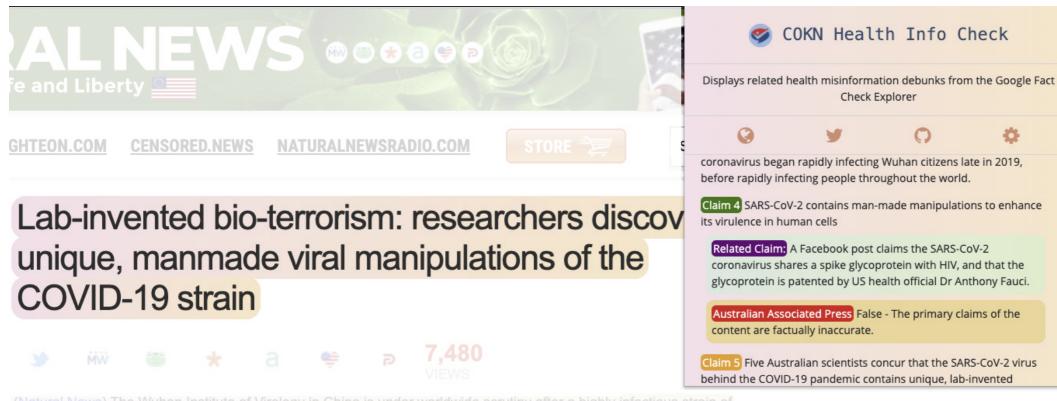








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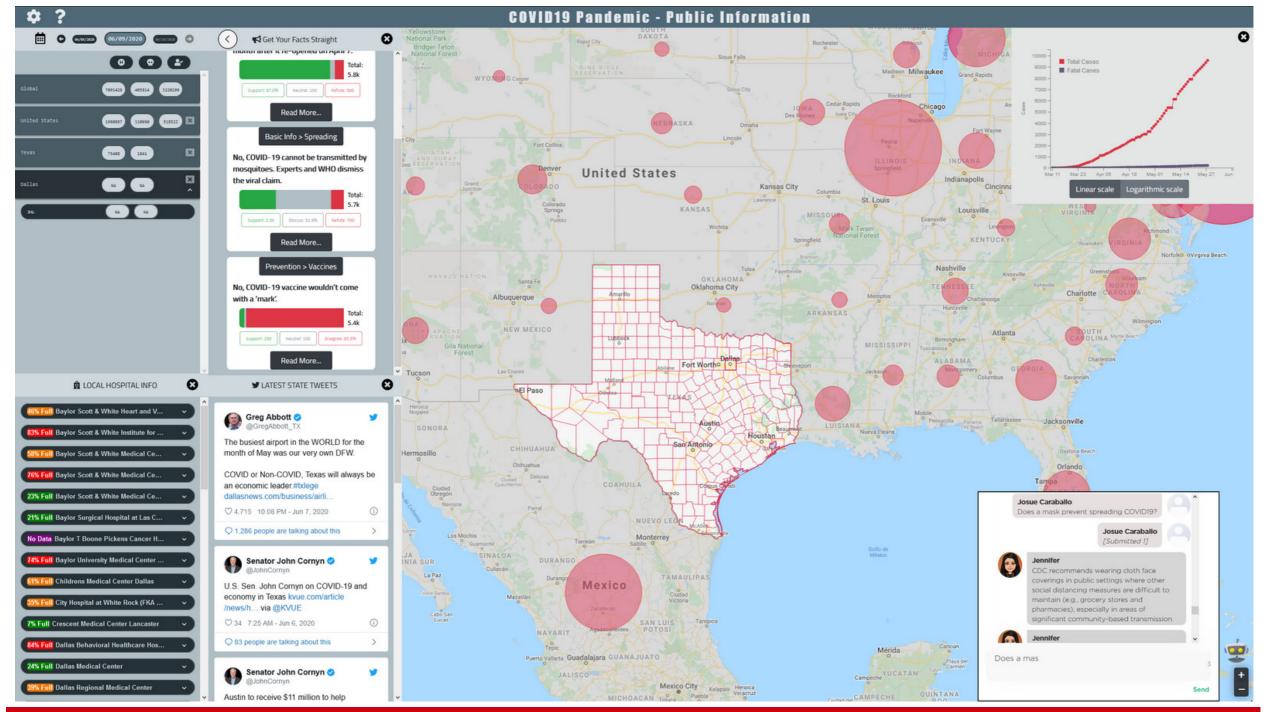
(Natural News) The Wuhan Institute of Virology in China is under worldwide scrutiny after a highly infectious strain of coronavirus began rapidly infecting Wuhan citizens late in 2019, before rapidly infecting people throughout the world.

Now a new Australian study finds that the precise RNA sequence of the SARS-CoV-2 virus contains man-made manipulations that could have only been created in a laborato The Wuhan Institute of Virology is home to questionable virus experiments that push the boundaries of scientific ethics. For years, Chinese researchers have been conducting gain-of-function research on bat coronaviruses to manipulate the properties of viruses a to check their virulence and infectivity.

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Deliverable: Browser plugin to flag health misinformation





Deliverable: COVID-19 fact-check dashboard https://idir.uta.edu/covid-19/



# Partners for Testing / Deploying the Deliverables

health misinformation mitigation







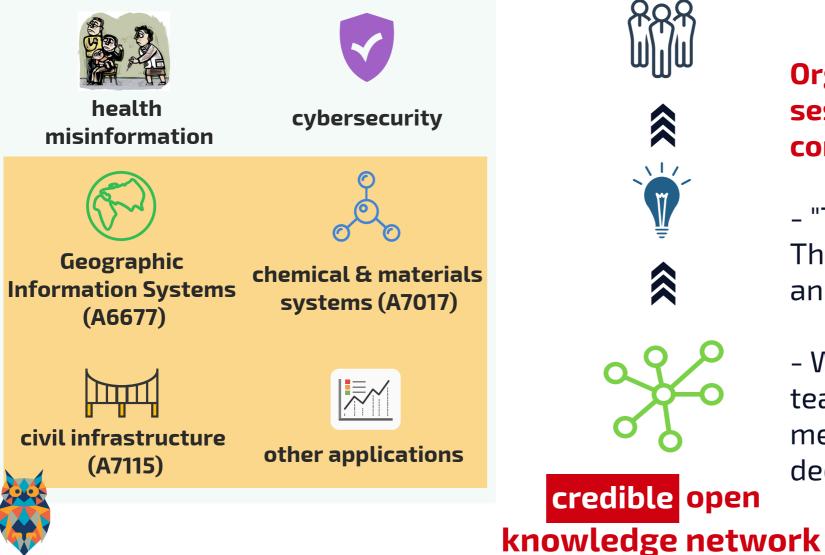








### **Track Success: Applying Cross-Cutting Framework** with Collaborative Teams





**Organizing informal discussion** session, June 17, SIGMOD conference

- "Transitioning Research to Practice: The NSF Convergence Accelerator and Open Knowledge Network"



- With participation of NSF and other teams, including A7160 (precision medicine) and A7908 (spatial decision support)



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subjective credibility strategies

**renowned social scientists** in credibility, persuasion, psychology, and communication

objective credibility tools

leading computer scientists 27





















UCSB









