

Open  
Research  
Knowledge  
Graph

# What is ORKG?

Yaser Jaradeh @ L3S/TIB

**DaMaLOS 2020 Workshop**

# A view on scholarly communication



1620

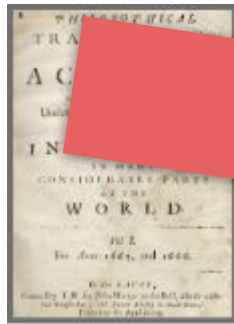


1883



2020

# A view on scholarly communication



1620



1883



2020

*So nothing has changed?*

## What about Metadata?

**Well.. some things changed**

(MAG, Crossref, Wikidata, WikiCite, Researchgate, Semantic Scholar)

ORCID



**But what about the content ?**

(i.e., the contributions)



Let's first think about it (what about other domains?)

# spectrum

**The Top 50  
SOFTWARE  
TITLES**

Selected by Britain's leading Software Distributor  
**MICRO DEALER UK**



Amstrad	100%
Apple II	100%
Atari	100%
Commodore 64	100%
IBM PC	100%
MSX	100%
Orion	100%
Osborne	100%
Radio Shack	100%
Sharp	100%
Spectravision	100%
Tandy	100%
Toshiba	100%
Video	100%
Wang	100%
Zenith	100%
Amstrad	100%
Apple II	100%
Atari	100%
Commodore 64	100%
IBM PC	100%
MSX	100%
Orion	100%
Osborne	100%
Radio Shack	100%
Sharp	100%
Spectravision	100%
Tandy	100%
Toshiba	100%
Video	100%
Wang	100%
Zenith	100%

**Superb value-for-money!**

## MEMOTECH MTX SERIES



**MEMOTECH MTX 512  
64K RAM**

MEMOTECH MTX 512 is a superb value-for-money computer system. It features a 64K RAM, a 5.25" floppy disk drive, and a keyboard. The system is easy to use and is perfect for home or office use.

**SPECTRUM PRICE £315.00**

Also available MTX 500  
32K RAM ..... £275

**DRAGON**



**DRAGON 64 £215.00**

**SHARP**



**SHARP MZ-711**  
1M2 100 Games Computer

Check with your local SPECTRUM dealer for our LOW price

**DRAGON 64 £215.00**

Let's first think about it (what about other domains?)



# Let's first think about it (what about other domains?)

**spectrum**

**The Top 50 SOFTWARE TITLES**  
Selected by Britain's leading Software Distributor  
**MICRO DEALER UK**

**Superb value-for-money!**  
**MEMOTECH MTX SERIES**

**MEMOTECH MTX 512 64K RAM**  
SPECTRUM PRICE **£315**  
Also available MTX 500 32K RAM ..... £275

**FDX DISK DRIVE**  
SPECTRUM PRICE **£275**

**DRAGON 32**  
Check with your local SPECTRUM dealer for our LOW price

**SHARP MZ-711**  
SPECTRUM PRICE **£249.95**  
with FREE Cassette Recorder and 10 FREE Games

Software Title	Price
Adventure	£1.99
Arkanoid	£4.99
Assault	£4.99
Backgammon	£1.99
Baseball	£1.99
Baseball 2	£1.99
Baseball 3	£1.99
Baseball 4	£1.99
Baseball 5	£1.99
Baseball 6	£1.99
Baseball 7	£1.99
Baseball 8	£1.99
Baseball 9	£1.99
Baseball 10	£1.99
Baseball 11	£1.99
Baseball 12	£1.99
Baseball 13	£1.99
Baseball 14	£1.99
Baseball 15	£1.99
Baseball 16	£1.99
Baseball 17	£1.99
Baseball 18	£1.99
Baseball 19	£1.99
Baseball 20	£1.99
Baseball 21	£1.99
Baseball 22	£1.99
Baseball 23	£1.99
Baseball 24	£1.99
Baseball 25	£1.99
Baseball 26	£1.99
Baseball 27	£1.99
Baseball 28	£1.99
Baseball 29	£1.99
Baseball 30	£1.99
Baseball 31	£1.99
Baseball 32	£1.99
Baseball 33	£1.99
Baseball 34	£1.99
Baseball 35	£1.99
Baseball 36	£1.99
Baseball 37	£1.99
Baseball 38	£1.99
Baseball 39	£1.99
Baseball 40	£1.99
Baseball 41	£1.99
Baseball 42	£1.99
Baseball 43	£1.99
Baseball 44	£1.99
Baseball 45	£1.99
Baseball 46	£1.99
Baseball 47	£1.99
Baseball 48	£1.99
Baseball 49	£1.99
Baseball 50	£1.99



amazon.de All computer EN Hello, Allard Account & Lists Returns & Orders Your Prime Shopping Basket

DHL Hannover 30167 Best Sellers Prime Video Allard's Amazon Fashion Shop men and women's fashion

Amazon.de SALE Warehouse Deals Vouchers Fashion-Sale Family Students Subscribe & Save Pantry Gift Central Apps Amazon Assistant

1-16 of over 100,000 results for "computer" Sort by: Featured

Amazon Prime  prime

Delivery Day  Get it by Tomorrow

Prime Wardrobe  prime wardrobe

Department Computer & Accessories Desktop PCs Laptops Computer & Server Racks Foreign Language Books Computers & Internet Children's Computer Books Video & Electronic Games Children's Entertainment & Games Almanacs & Yearbooks German Books Computers & Internet Children's Books on Computers & Technology Children's Books on Computer Entertainment & Games Games Computers for Young Adults

Kindle Store Computers & Internet (Foreign Language) Computers & Internet (English) Science & Nature (Foreign Language) Business & Money (Foreign Language)

Apple **Es gibt für jeden eine Mac.** Shop Mac - Apple (DE) Apple iMac 4.6  prime

Sponsored **dercomputerladen Gaming PC White, Black, RGB - Intel, AMD Ryzen - Windows 10 Pro Games Computer** 4.5  prime **£1,075.00**

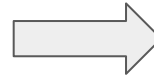
Sponsored **dercomputerladen Cylon Bolt RGB Gaming PC - Intel i7 9700K, i9 9900KF - Ryzen 5 2600, 7 3700X - Windows 10...** 4.5  prime **£710.00**

Hmm interesting (still other domains?)





Hmm interesting (still other domains?)



Hmm interesting (still other domains?)

**They didn't just made a digital format, they  
revolutionized the domain**



What about scholarly domain?

**Finding and comparing scientific literature is time consuming**



# What about scholarly domain?

**Finding and comparing scientific literature is time consuming**



## Finding the right papers

knowledge graph visualization

About 1.310.000 results (0,52 sec)

**RelFinder: Revealing relationships in RDF knowledge bases**  
P. Heim, S. Hellmann, J. Lehmann, S. Lohmann, ... Conference on Semantic ... 2009 - Springer  
... The search terms that are entered by the user in the two input fields in the upper left corner (Fig. 1, A) get mapped to unique objects of the knowledge base. These constitute the left and right starting nodes in the graph visualization (Fig. ...  
☆ ⓘ Cited by 188 Related articles All 17 versions

[PDF] Interactive visualization tools for exploring the semantic graph of large knowledge spaces  
C. Hirsch, J. Hosking, J. Grundy, ... on Visual Interfaces to the Social ... 2009 - researchgate.net  
While the amount of available information on the Web is increasing rapidly, the problem of managing it becomes more difficult. We present two applications, Thinkbase and

1.310.000  
results

## Comparing results

“Our visualization tool is able to visualize graphs, charts and trees”



“The focus lies on visualizing graphs”

## The solution

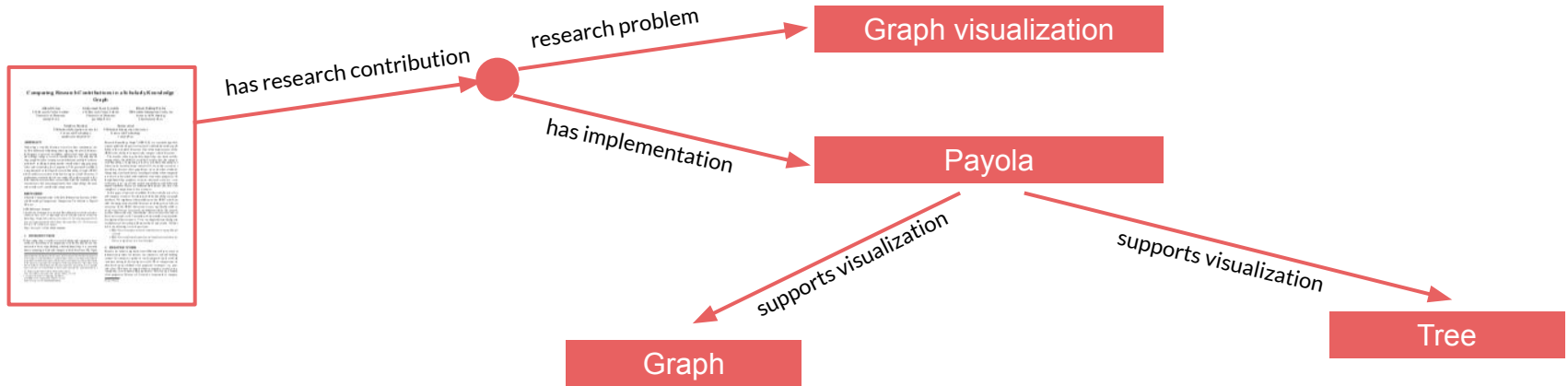
**We need structured research data**

**The Open Research Knowledge Graph (ORKG) focuses on making research papers structured by using mainly crowdsourcing**



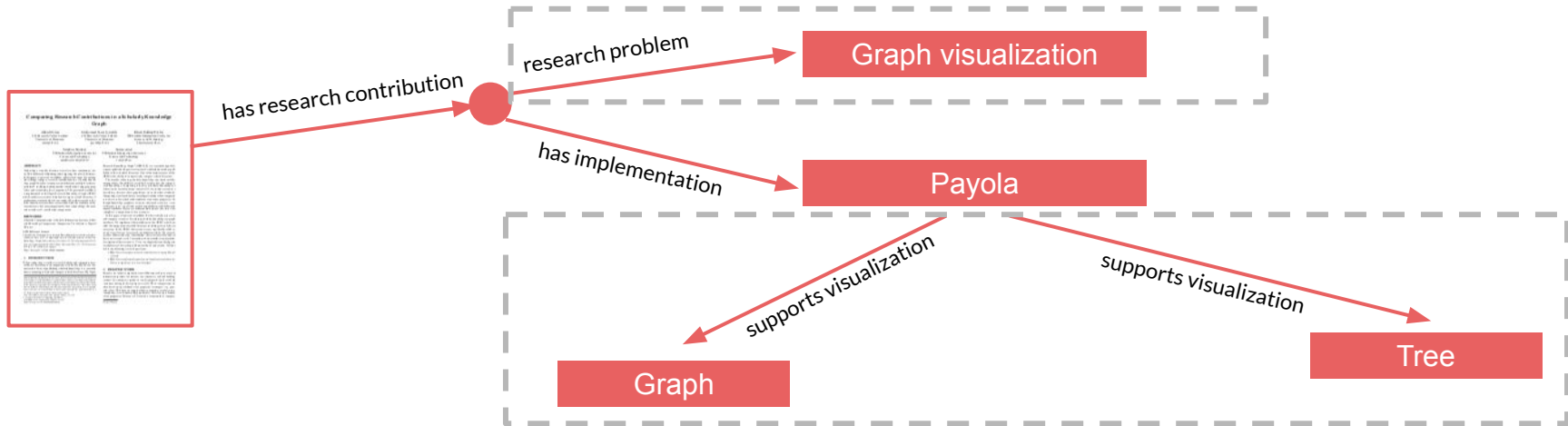
# Open Research Knowledge Graph

- The **Open Research Knowledge Graph (ORKG)** focuses on making research papers structured by using mainly **crowdsourcing**



# Open Research Knowledge Graph

- The **Open Research Knowledge Graph (ORKG)** focuses on making research papers structured by using mainly **crowdsourcing**



## Crowdsourcing, really?

- For generating the structured paper descriptions
- Why: automated methods (e.g., NLP) are not accurate enough to generate a high quality knowledge graph
- Who: paper authors and domain experts



## Situational Knowledge Representation for Traffic Observed by a Pavement Vibration Sensor Network

Markus Stocker, Mauno Rönkkö, and Mikko Kolehmainen

**Abstract**—Information systems that build on sensor networks often process data produced by measuring physical properties. These data can serve in the acquisition of knowledge for real-world situations that are of interest to information services and, ultimately, to people. Such systems face a common challenge, namely the considerable gap between the data produced by measurement and the abstract terminology used to describe real-world situations. We present and discuss the architecture of a software system that utilizes sensor data, digital signal processing, machine learning, and knowledge representation and reasoning to acquire, represent, and infer knowledge about real-world situations observable by a sensor network. We demonstrate the application of the system to vehicle detection and classification by measurement of road pavement vibration. Thus, real-world situations involve vehicles and information for their type, speed, and driving direction.

**Index Terms**—Knowledge acquisition, knowledge representation, machine learning, sensor data, sensor networks, traffic monitoring.

### I. INTRODUCTION

WE propose a software system architecture and implementation for the continuous and automated representation of knowledge for real-world situations observable by a sensor network. In this paper, we demonstrate the application of the software system to intelligent transportation systems. Thus, real-world situations involve vehicles and information for their type, speed, and driving direction.

According to Finkelstein [1], “measurement is the process of empirical, objective, assignment of numbers to properties of objects or events of the real world in such a way as to describe them.” A sensor is a device that performs measurement, in that it transforms the signal of a physical property (e.g., heat) into numbers or, more generally, into data [2]. Sensor measurement is, hence, the process of recurrent application of such transformation for certain temporal and spatial locations. The result of sensor measurement is sensor data. Sensor data represent the change of the signal over time.

Despite recent advancements in sensor data management, processing, and query [2]–[4], as well as semantic description

of sensors and data [5]–[7], making sense of sensor data is an ongoing challenge [8]–[10] because of the difference in the degree to which sensor data represents information about a signal and information about, or related to, a physical property [11]. In other words, it is a challenge because of the considerable gap between data produced by measurement and abstract terminology [12] used by people to describe (the properties of) real-world objects or events.

We are interested in *situations* involving real-world objects that affect a physical property, for which a signal is measured by means of sensors. In this paper, vehicles are the real-world objects and road pavement vibration is the physical property. We present the architecture of a software system that utilizes digital signal processing, machine learning, and knowledge representation and reasoning to acquire, represent, and infer knowledge about real-world situations involving vehicles. The system aims at reducing the gap between road pavement vibration measurement data and abstract terminology used to describe real-world situations involving vehicles.

Digital signal processing techniques are iteratively applied to a sliding window over sensor data to enhance the vibration signal and to transform sensor data (time domain) into patterns (frequency domain). Machine learning is used to classify patterns. We employ multilayer perceptron (MLP) feedforward artificial neural networks [13]. Techniques in knowledge representation are utilized to formally represent domain concepts, instances, and relations. A concept of interest to our domain is the vibration sensor. The (installed) sensors are represented as instances of this concept. An instance may have a number of relations, e.g., to a spatial location. We represent sensors and observations using the Semantic Sensor Network Ontology (SSNO) [14].<sup>1</sup> SSNO is an “ontology for describing the capabilities of sensors, the act of sensing and the resulting observations” [15]. We employ the Situation Theory Ontology<sup>2</sup> (STO) [16] to represent knowledge about real-world situations, which are acquired from observations. The STO captures the key aspects of the situation theory developed by Barwise and Perry [17] and extended by Devlin [18]. The theory relates to the work on situation awareness by Endsley [19]. [20] as it encompasses most of the concepts discussed in [16]. Both the SSNO and the STO serve as upper ontologies from which we extend to accommodate domain knowledge. The hybrid use of the SSNO and the STO allows for a multilevel abstraction of sensor measurement data and the use of appropriate terminology and formalization at each level.

Manuscript received April 12, 2013; revised August 16, 2013 and November 20, 2013; accepted December 22, 2013. Date of publication February 4, 2014; date of current version August 1, 2014. The infrastructure to access and collect vibration and camera data, as well as the data, are part of research funded by Tekes, the Finnish Funding Agency for Technology and Innovation (funding decision number 40075009). The Associate Editor for this paper was P. Gruber.

The authors are with the Department of Environmental Science, University of Eastern Finland, 70211 Kuopio, Finland (e-mail: markus.stocker@uef.fi; mauno.ronkko@uef.fi; mikko.kolehmainen@uef.fi).

Digital Object Identifier 10.1109/ITITS.2013.2296697

1524-9050 © 2014 IEEE. Personal use is permitted, but republication/redistribution requires IEEE permission. See [http://www.ieee.org/publications\\_standards/publications/rights/index.html](http://www.ieee.org/publications_standards/publications/rights/index.html) for more information.

<sup>1</sup><http://purl.oclc.org/NET/SSNO>

<sup>2</sup><http://stisociety.com/ont/2006/STOSTO.owl>



### View paper

View paper

Graph view

Edit

## Situational Knowledge Representation for Traffic Observed by a Pavement Vibration Sensor Network

February 2014

Information Science

Markus Stocker

Mauno Rönkkö

Mikko Kolehmainen

DOI: 10.1109/ITITS.2013.2296697

Share this paper:

Contributions

Classification Detection Knowledge Representation Reasoning

### Research problems

Road vehicle classification

Add to comparison

### Contribution data

Employs

Machine Learning

Utilizes

A sensor network

Training Data

Waikato Environment for Knowledge Analysis

Yields

Classification performance for the three sensors (sd1, sd2, sd3)

Summary of precision and recall figures for the light and heavy classes of the vehicle classification task for the three sensors (sd1, sd2, sd3)

Summary of the confusion matrices for the vehicle classification task for the three sensors (sd1, sd2, sd3)

Methods

Materials

Results

# Why ORKG?

Contribution comparison 3 View + Add contribution More

### Covid-19 Reproductive Number Estimates

Method: Intelligent merge

Properties	The early phase of the COVID-19 outbreak in Lombardy, Italy <small>Contribution 1 - 2020</small>	Transmission potential of COVID-19 in Iran <small>Contribution 1 - 2020</small>	Transmission potential of COVID-19 in Iran <small>Contribution 2 - 2020</small>
Has value	3.1	3.6	3.58
Location	Lombardy, Italy	Iran	Iran
Confidence interval (95%)	Confidence interval (95%)	Confidence interval (95%)	Confidence interval (95%)
Lower confidence limit	2.9	3.4	1.29
Upper confidence limit	3.2	4.2	8.46
Has beginning	2020-01-14	2020-02-19	2020-02-19
Has end	2020-03-08	2020-02-29	2020-02-29

# Want another reason?

Classification | Detection | Knowledge Representation | Reasoning

**Research problems**  Add to comparison

Road vehicle classification

**Contribution data**

Employs	Machine Learning
Utilizes	A sensor network
	Training Data
	Waikato Environment for Knowledge Analysis
Yields	Classification performance for the three sensors (sd1, sd2, sd3)
	Summary of precision and recall figures for the light and heavy classes of the vehicle classification task for the three sensors (sd1, sd2, sd3)
	Summary of the confusion matrices for the vehicle classification task for the three sensors (sd1, sd2, sd3)

## Similar contributions

73% Situational Knowledge Representation for Traffic Observed by a Pavement Vibration Sensor Network  
Detection

59% Situational Knowledge Representation for Traffic Observed by a Pavement Vibration Sensor Network  
Knowledge Representation

10% Low-cost adsorbents for heavy metals uptake from contaminated water: a review  
Contribution 1

Compare these contributions

Give me more reasons!

## Search results

Search query

Author



Type

- Paper
- Research Problem
- Author
- Comparison
- Venue
- Resource
- Property

### Paper

[Decentralised Authoring, Annotations and Notifications for a Read-Write Web with dokieli](#)

[IsaViz: a Visual Environment for Browsing and Authoring RDF Models](#)

[On the combination of domain-specific heuristics for author name disambiguation: the nearest cluster method](#)

[Citation-based bootstrapping for large-scale author disambiguation](#)

[+ Load more](#)

### Research Problem

[Author name disambiguation](#)

### Comparison

[Semi-supervised author name disambiguation](#)

📅 20 January 2020

[Unsupervised author name disambiguation](#)

📅 17 December 2019

[Supervised author name disambiguation](#)

📅 17 December 2019

[Graph-based author name disambiguation](#)

📅 17 December 2019

### Resource

[Author social graph](#)

[Co-author graphs](#)

[Co-authorship](#)

[IEEE Explore Vietnamese authors](#)

[Co-authors](#)

[Author name](#)

[+ Load more](#)

### Property

[Author's conclusions](#)

Wow! also this

```
import requests
import datetime
import pandas as pd
import numpy as np
from orkg import ORKG
from bokeh.io import export_png
from bokeh.models import ColumnDataSource, HoverTool, WheelZoomTool, ResetTool, S
from bokeh.plotting import figure, show, output_notebook

output_notebook()

orkg = ORKG(host='https://orkg.org/orkg', simcomp_host='https://orkg.org/simcomp')
df = orkg.contributions.compare_dataframe(comparison_id='R44930')

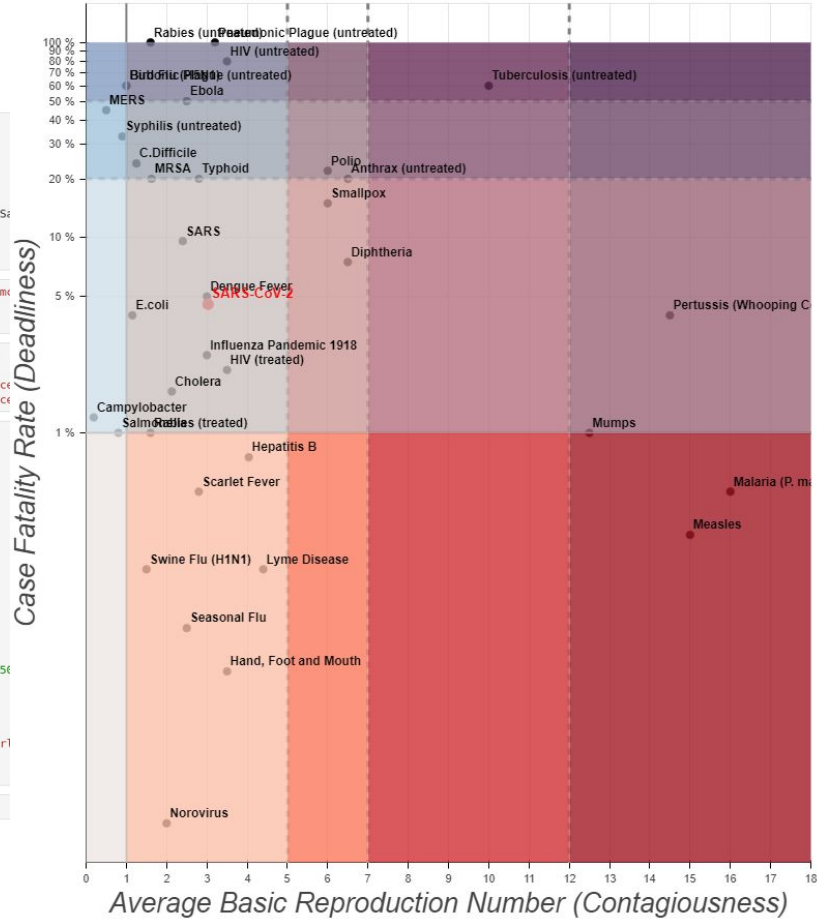
dates = np.array([datetime.date.fromisoformat(x) for x in df.loc['has end', :]])
values = np.float32(df.loc['has value', :])
lower = np.array([np.float32(x) if x else np.nan for x in df.loc['Lower confidence interval', :]])
upper = np.array([np.float32(x) if x else np.nan for x in df.loc['Upper confidence interval', :]])

hover1 = HoverTool(
    tooltips=[
        ('Date', '@date{%F}'),
        ('R0', '@value{0.0ff}'),
        ('95% CI', '@lower{0.0ff}-@upper{0.0ff}')
    ],
    formatters={
        '@date': 'datetime',
        '@value': ': ' + 'printf',
        '@lower': ': ' + 'printf',
        '@upper': ': ' + 'printf'
    }
)

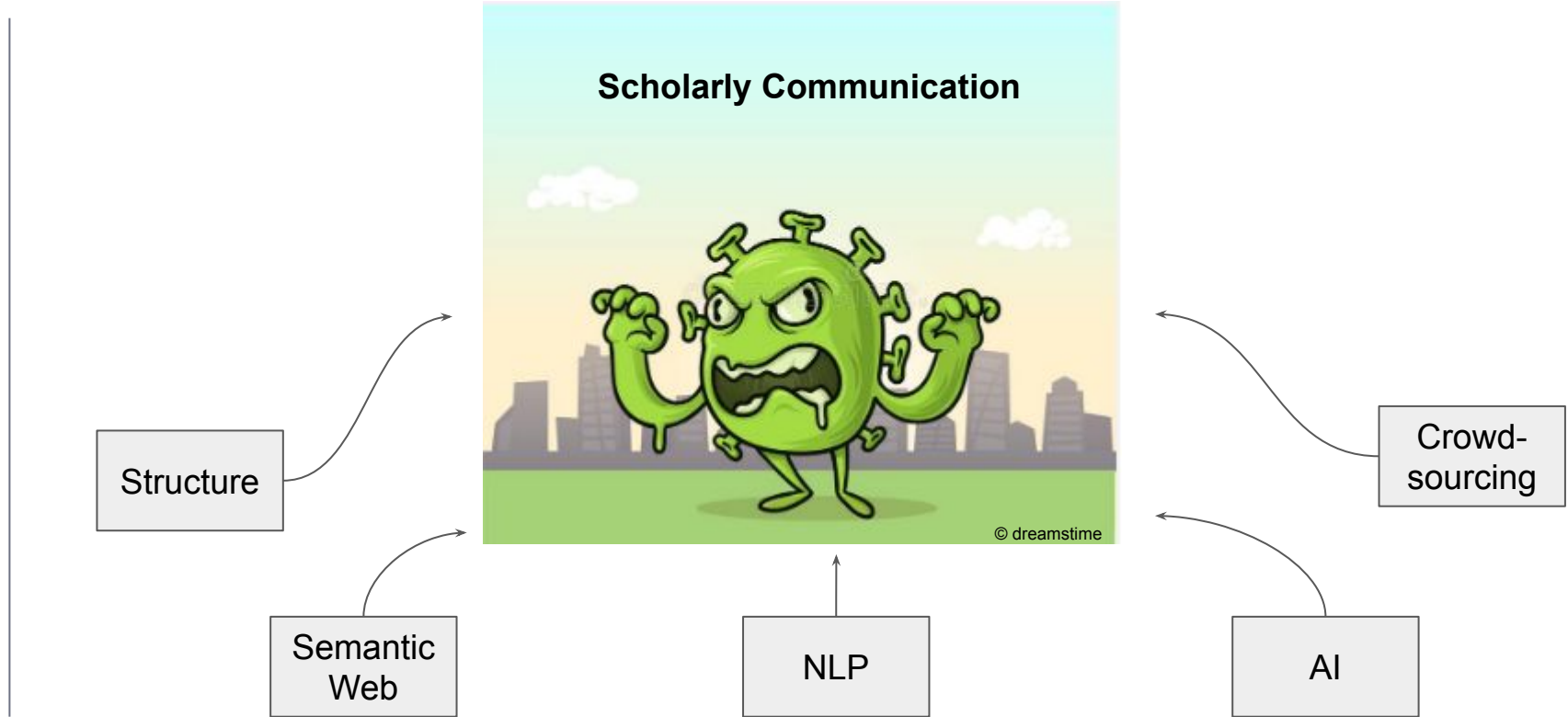
df = pd.DataFrame(data=dict(date=dates, value=values, lower=lower, upper=upper))
source = ColumnDataSource(df)
p = figure(x_axis_type='datetime', y_range=(0, 9), plot_width=800, plot_height=350)
p.xaxis.formatter=DatetimeTickFormatter(days=['%d %b'])
p.yaxis.axis_label = 'basic reproduction number'
p.circle('date', 'value', source=source, size=7, color='purple')
p.add_layout(
    Whisker(source=source, base='date', upper='upper', lower='lower', level='overl
)
show(p)

export_png(p, filename='img/R0-estimates-plot.png')
```

### The Microbe-scope



# How to add papers into ORKG



# How to add papers into ORKG



ORKG

Papers

Tools ▾

About

Search...



Add paper



## Add paper wizard



The wizard guides you to the process of generating structured data for your paper

## PDF sentence annotator



Upload your paper as PDF and annotate the most important sentences

## Survey importer

Table 1	Overview of survey results in the survey					
Survey ID	Survey Name	Survey Type	Survey Status	Survey Date	Survey Location	Survey Author
1	Survey 1	Survey 1	Survey 1	Survey 1	Survey 1	Survey 1
2	Survey 2	Survey 2	Survey 2	Survey 2	Survey 2	Survey 2
3	Survey 3	Survey 3	Survey 3	Survey 3	Survey 3	Survey 3
4	Survey 4	Survey 4	Survey 4	Survey 4	Survey 4	Survey 4
5	Survey 5	Survey 5	Survey 5	Survey 5	Survey 5	Survey 5
6	Survey 6	Survey 6	Survey 6	Survey 6	Survey 6	Survey 6
7	Survey 7	Survey 7	Survey 7	Survey 7	Survey 7	Survey 7
8	Survey 8	Survey 8	Survey 8	Survey 8	Survey 8	Survey 8
9	Survey 9	Survey 9	Survey 9	Survey 9	Survey 9	Survey 9
10	Survey 10	Survey 10	Survey 10	Survey 10	Survey 10	Survey 10

Import already existing surveys into the ORKG directly from the PDF article

## Survey publisher

Survey ID	Survey Name	Survey Type	Survey Status	Survey Date	Survey Location	Survey Author
1	Survey 1	Survey 1	Survey 1	Survey 1	Survey 1	Survey 1
2	Survey 2	Survey 2	Survey 2	Survey 2	Survey 2	Survey 2
3	Survey 3	Survey 3	Survey 3	Survey 3	Survey 3	Survey 3
4	Survey 4	Survey 4	Survey 4	Survey 4	Survey 4	Survey 4
5	Survey 5	Survey 5	Survey 5	Survey 5	Survey 5	Survey 5
6	Survey 6	Survey 6	Survey 6	Survey 6	Survey 6	Survey 6
7	Survey 7	Survey 7	Survey 7	Survey 7	Survey 7	Survey 7
8	Survey 8	Survey 8	Survey 8	Survey 8	Survey 8	Survey 8
9	Survey 9	Survey 9	Survey 9	Survey 9	Survey 9	Survey 9
10	Survey 10	Survey 10	Survey 10	Survey 10	Survey 10	Survey 10

Create a new survey in a spreadsheet editor and add papers in bulk to ORKG

## CSV upload



Upload a CSV file containing a list of papers and import them in bulk to ORKG

# Paper Wizard

The screenshot shows the ORKG Paper Wizard interface. At the top, there is a navigation bar with the ORKG logo, 'Papers', 'Tools', and 'About' menus. A search bar and an 'Add paper' button are also present. Below the navigation bar, the main content area is titled 'Add paper | Open Research Knowledge Graph: Next Generation Infrastructure for Semantic Scholarly Knowledge'. A progress indicator shows three steps: 1. General, 2. Research field, and 3. Contributions. The current step is 'Specify research contributions'. A red button labeled 'Contribution 1' is visible. Below it, there is a 'Use template' section with several template options: 'SEIR', 'date\_v2 (test)', 'date', 'Case fatality rate estimate', 'Basic reproduction number estimate', 'Student's t-test', and 'Research Problem'. A 'Has research problem' section is also present, with a search input field and a dropdown menu. The dropdown menu is open, showing a list of resources with their IDs: 'limiting similarity hypothesis' (R52142), 'software' (R51454), 'Verification of a biomonitoring method for the determination of arsenic species in urine' (R51437), 'Verification of a biomonitoring method for the determination of 6-aminolevulinic acid in urine' (R51433), and 'Verifizierung einer Biomonitoring-Methode zur Bestimmung von Arsenspezies in Urin' (R51430). At the bottom right, there are 'Previous step' and 'Finish' buttons.



# PDF Annotator (Alpha)

Paper annotator Save

Completion 30%

Smart sentence detection

Background 0 annotations

Contribution 1 annotation

Methods 0 annotations

Problem statement 1 annotation

Results 1 annotation

## A Model for Reasoning About JavaScript Promises

MAGNUS MADSEN, ONDŘEJ LHOŤÁK, and FRANK TIP, Northern

In JavaScript programs, asynchronous control flow is used for managing asynchronous operations that is hard to understand. This paper presents a formal mechanism for managing asynchronous operations, supporting proper error handling, so that programmers would be able to reason about the correctness of their code.

Since the ECMAScript 6 specification, JavaScript engines, it does not provide a suitable basis for formal reasoning. This paper presents  $\lambda_p$ , a core calculus that captures the essence of ECMAScript 6 promises. Based on  $\lambda_p$ , we introduce the *promise graph*, a program representation that can assist programmers with debugging of promise-based code. We then report on a case study in which we investigate how the promise graph can be helpful for debugging errors related to promises in code fragments posted to the StackOverflow website.

CCS Concepts: • Theory of computation → Operational semantics; Program reasoning; • Software and its engineering → Object oriented languages;

Additional Key Words and Phrases: EcmaScript 6, Promises, JavaScript, Formal Semantics, Promise Graph

**ACM Reference Format:**

Magnus Madsen, Ondřej Lhoták, and Frank Tip. 2017. A Model for Reasoning About JavaScript Promises. *Proc. ACM Program. Lang.* 1, OOPSLA, Article 86 (October 2017), 24 pages. <https://doi.org/10.1145/3133910>

### 1 INTRODUCTION

Asynchronous control flow is widely used in the JavaScript community for a variety of tasks such as implementing web-based user-interfaces, communicating with servers through HTTP requests, and non-blocking I/O. The most popular approach for accommodating asynchrony in

Select type

Select...

Smart suggestions

Related work Contribution

Annotate



# Survey Importer (Beta)

Survey table extractor ?



Discard PDF

TABLE I. SUMMARY OF PAPERS INCLUDED IN THE SURVEY

Author	Educational context	Evaluator	Method	Result	Topic
Rub11 [13]	Elementary	Developer	Mixed-method	Positive	Bullying
Kato08 [14]	General	Independent	Experiment	Positive	Cancer treatment
Pap09 [15]	Secondary School	Developer	Experiment	Positive	Computer Science
Sind09 [16]	Higher Education	Developer	Experiment	Neutral	Computer Science
Ebn07 [18]	Higher Education	Developer	Experiment	Positive	Engineering
Chu07 [19]	Elementary	Independent	Experiment	Positive	Fire fighting
Vos11 [20]	Elementary	Independent	Experiment	Positive	First language
Asa12 [21]		Independent	Experiment	Positive	Geography
Tüz09 [22]	Elementary	Independent	Mixed-method	Positive	Geography
Vir05 [23]	Elementary	Developer	Experiment	Positive	Geography
Tüz07 [24]	Elementary	Developer	Mixed-method	Unclear	Health
Hui09 [25]	Elementary	Independent	Quasi-experimental	Positive	History
Kenn11 [26]	Higher Education	Independent	Single instance trial	Positive	History
Conn11 [27]	Secondary School	Developer	Experiment	Negative	Language
Rou06 [17]	Elementary	Unclear	Experiment	Neutral	Mathematics/conceptual
Cho11 [28]	Higher Education	Independent	Case study	Positive	Mathematics
Kim10 [12]	Elementary	Independent	Survey	Negative	Mathematics
Kab10 [29]	Higher Education	Developer	Experiment	Neutral	Mathematics
Ke07 [30]	Elementary	Independent	Experiment	Positive	Mathematics
Qm10 [50]	Higher Education	Developer	Pilot-study	Positive	Surgey

Table extraction ?



1	Author	Educational context	Evaluator	Method	Result	Topic
2	Rub11 [13]	Elementary	Developer	Mixed-method	Positive	Bullying
3	Kato08 [14]	General	Independent	Experiment	Positive	Cancer treatment
4	Pap09 [15]	Secondary School	Developer	Experiment	Positive	Computer Science
5	Sind09 [16]	Higher Education	Developer	Experiment	Neutral	Computer Science
6	Ebn07 [18]	Higher Education	Developer	Experiment	Positive	Engineering
7	Chu07 [19]	Elementary	Independent	Experiment	Positive	Fire fighting
8	Vos11 [20]	Elementary	Independent	Experiment	Positive	First language
9	Asa12 [21]		Independent	Experiment	Positive	Geography
10	Tüz09 [22]	Elementary	Independent	Mixed-method	Positive	Geography
11	Vir05 [23]	Elementary	Developer	Experiment	Positive	Geography
12	Tüz07 [24]	Elementary	Developer	Mixed-method	Unclear	Health
13	Hui09 [25]	Elementary	Independent	Quasi-experimental	Positive	History
14	Kenn11 [26]	Higher Education	Independent	Single instance trial	Positive	History
15	Conn11 [27]	Secondary School	Developer	Experiment	Negative	Language
16	Rou06 [17]	Elementary	Unclear	Experiment	Neutral	Mathematics/conceptual
17	Cho11 [28]	Higher Education	Independent	Case study	Positive	Mathematics
18	Kim10 [12]	Elementary	Independent	Survey	Negative	Mathematics
19	Kab10 [29]	Higher Education	Developer	Experiment	Neutral	Mathematics
20	Ke07 [30]	Elementary	Independent	Experiment	Positive	Mathematics

Extract references

Download CSV

Transpose

Remove empty rows

Import data

# Survey Builder (WIP)

Survey builder

View survey

Finish

Insert row above

Insert row below

Remove row

Insert column left

Insert column right

Remove column

	Title	Authors	Publication date	DOI	Algorithm	Population
1	Algorithm and hardware for a merge sort using	S. Todd	2019-06	10.1016/2017.11.022	Merge sort	234,543,457
2	A variant of heapsort with almost optimal...	X. Svante	2004-06	10.2336/203.43.2 	Heap sort	256,565,655
		C. Carlsson				242,333,343
		H. Persons				345,444,566
3	Bubble sort: an archaeological algorithmic	Owen Astrachan	1997-06	10.5445/23.33.3332	Bubble sort	878,434,111
		H. Secondsson				122,344,222
						211,886,664

Is this it?

Currently

Goal



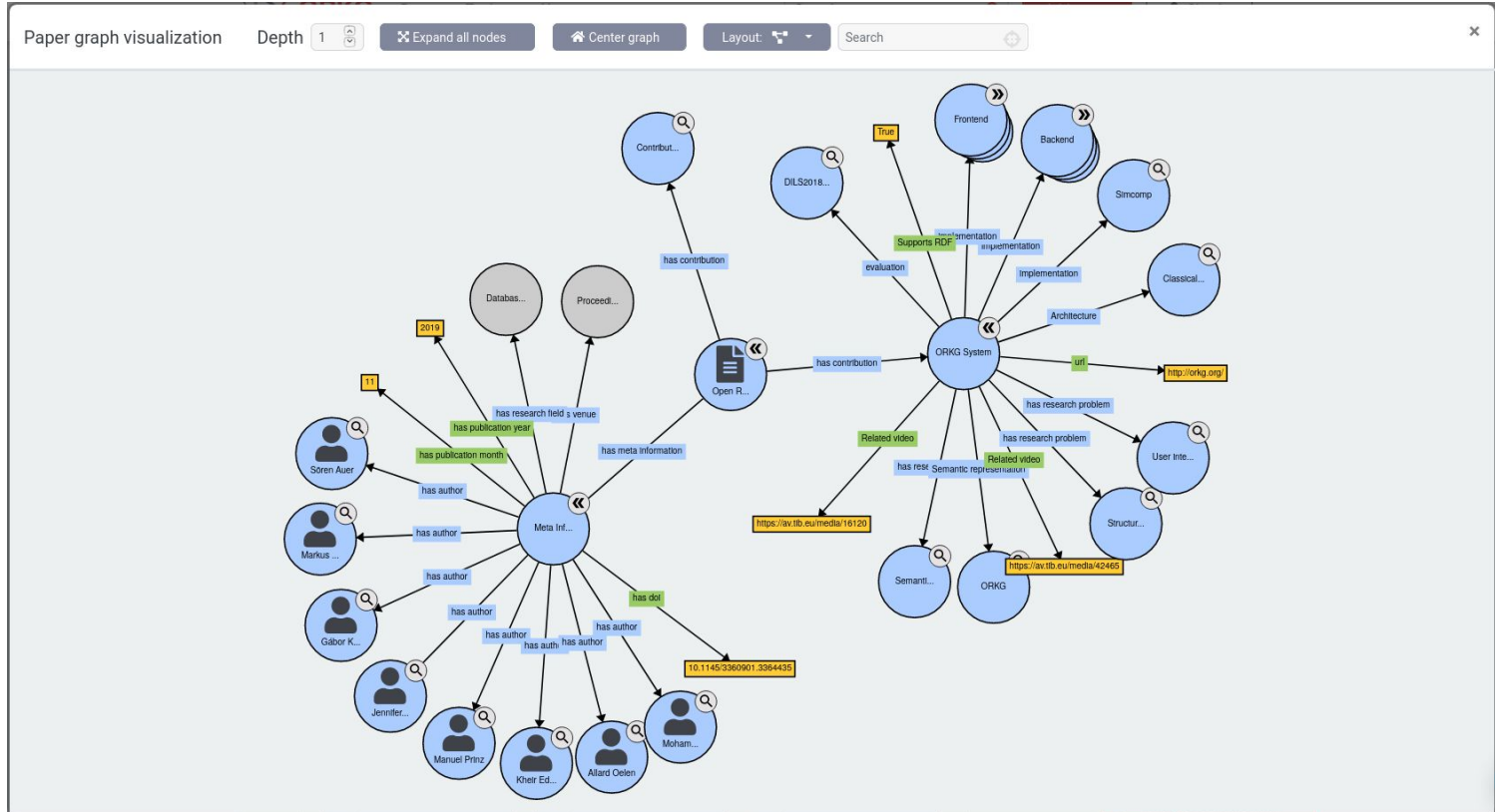
## And we still have a lot more (Abstract Annotator)

### Abstract annotation

Info: we automatically annotated the abstract for you. Please select the concepts you think are correct.

A description is given of the Amoeba **distributed operating system**, which appears to users as a **centralized system** but has the **speed**, fault tolerance, security safeguards, and flexibility required for the 1990s. The **Amoeba software** is based on objects. Objects are managed by server processes **Type:** **Method** chosen **randomly** from a sparse name space. Amoeba has a unique, fast file system split into two parts: the **bul** **Add** files contiguously on the disk; the directory service gives capabilities symbolic names and handles **replicatio** ne need for a separate **transaction management system**. To bridge the gap with existing systems, Amoeba has a **Unix emulation** facility consisting of a library of Unix system call routines that make calls to the various Amoeba server

# And we still have a lot more (Graph Visualizer)



## And we still have a lot more (Tabular Data)

View dataset: DILS2018 User evaluation of ORKG frontend ×

Showing 13 observations : Options ⌵

Participant Nr	Navigation (5=very intuiti...	Terminology (5=Easy to u...	Auto complete (5=very he...	Guidance needed (5=All t...	Suggest to Others (9=ver...	UI likeness (9=Very much)	Time (in mins)
Search...	Search...	Search...	Search...	Search...	Search...	Search...	Search...
1	4	4	5	3	2	6	16
2	2	3	5	4	8	7	19
3	4	5	5	3	9	7	15
4	3	3	5	3	6	7	13
5	4	3	5	3	6	8	14
6	4	3	5	3	8	9	13
7	3	4	5	3	7	6	19
8	3	2	4	3	8	6	13
9	4	5	3	3	7	5	14
10	4	5	5	1	8	8	22

Previous Page 1 of 2 10 rows Next

# And we still have a lot more (RDF/SPARQL endpoint)

The screenshot displays the ORKG (Open Research Knowledge Graph) interface. At the top, there is a navigation bar with 'ORKG', 'Examples', 'Help', and 'More tools'. Below this is a SPARQL query editor with the following code:

```
1 #Papers timeline
2 #defaultView:TimeLine
3
4 PREFIX orkgr: <http://orkg.org/orkg/resource/>
5 PREFIX orkgc: <http://orkg.org/orkg/class/>
6 PREFIX orkgs: <http://orkg.org/orkg/predicate/>
7 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
8
9
10 SELECT ?paper, ?title, ?image, xsd:dateTime(?published) AS ?published
11 WHERE {
12   ?paper a orkgc:Paper;
13         rdfs:label ?title;
14         orkgs:P29 ?published.
15   BIND(URI(CONCAT(CONCAT("http://127.0.0.1:8080/images/", STRAFTER(STR(?paper), "http://orkg.org/orkg/resource/"), ".png")) AS ?image) .
16 }
17 ORDER BY ?paper
18 LIMIT 10
19
```

Below the query editor is a timeline visualization showing research papers from 2015 to 2019. The timeline is marked with months (Jul, Oct, Jan, Apr, Jul, Oct) for each year. Papers are represented by rectangular boxes with a thumbnail image and text:

- 2016: 1 January 2016, Professor Forcing: A New Algorithm for Training Recurrent Networks, orkgr:R10028
- 2017: 1 January 2017, Bag of Tricks for Efficient Text Classification, orkgr:R10034
- 2018: 1 January 2018, Assessing Generative Models via Precision and Recall, orkgr:R10096
- 2019: 1 January 2019, RedTyp: A Deep Generative Model for Text-to-Image Synthesis, orkgr:R10082
- 2019: 1 January 2019, Capsule Graph Neural Network, orkgr:R10082
- 2019: 1 January 2019, Deep Autoencoding Gaussian Mixture Model for Unsupervised Anomaly Detection, orkgr:R10073

The interface also shows a search bar, a 'Timeline' dropdown, and a status bar indicating '19 results in 28 ms'.



## And we still have a lot more (Linking to external ontologies)

### Select ontology

Please select ontologies from the list below:

- Biological Collections Ontology BCO  
<http://purl.obolibrary.org/obo/bco.owl>
- Basic Formal Ontology** BFO  
<http://purl.obolibrary.org/obo/bfo.owl>
- Biological Spatial Ontology BSPO  
<http://purl.obolibrary.org/obo/bspo.owl>
- The BRENDA Tissue Ontology (BTO) BTO  
<http://purl.obolibrary.org/obo/bto.owl>
- Common Anatomy Reference Ontology CARO  
<http://purl.obolibrary.org/obo/caro.owl>

### Classes

- immaterial entity BFO  
[http://purl.obolibrary.org/obo/BFO\\_0000141](http://purl.obolibrary.org/obo/BFO_0000141)
- independent continuant** BFO  
[http://purl.obolibrary.org/obo/BFO\\_0000004](http://purl.obolibrary.org/obo/BFO_0000004)  
b is an independent continuant = Def. b is a continuant which is such that there is no c and no t such that b s-depen...
- specifically dependent continuant BFO  
b is a specifically dependent continuant = Def. b is a continuant & there is some independent continuant c which  
[http://purl.obolibrary.org/obo/BFO\\_0000020](http://purl.obolibrary.org/obo/BFO_0000020)
- continuant BFO  
[http://purl.obolibrary.org/obo/BFO\\_0000002](http://purl.obolibrary.org/obo/BFO_0000002)

[Ontologies](#)

## And we still have a lot more (Publishing Comparisons)

Publish comparison ✕

A published comparison is made public to other users. The state of the comparison is saved and a persistent link is created.

Title ?  
Comparison of related scholarly knowledge graphs

Description ?  
This comparison focuses on comparing different scholarly knowledge graphs

Reference (optional) ?  
 +

Research Field ?  
Enter a research field | ▾

Creators ?  
 + Add creator


Assign a DOI to the comparison ?

This comparison will be marked as new version of the comparison [R50014](#)

# And we still have a lot more (Organizations)

Provenance | **Timeline**

**OCCUPANTS' PERCEPTION AND BEHAVIOUR**



Northwestern University

**DATE ADDED**  
08 Sep 2020

**ADDED BY**  
Giorgia Chinazzo


**CONTRIBUTORS**  
Giorgia Chinazzo

ORKG Papers Tools About


Search... Add paper Sign in

View all organizations


Sign in to create an organization




Uniklinik RWTH Aachen




Northwestern University




TIB Leibniz Information Centre for Science and Technology




L3S Research Center




ZB MED



InfAI Institut für Angewandte Informatik



International Future Lab for Artificial Intelligence in Hannover



Leibniz University of Hannover

And we still have a lot more  
(Observatories)

The screenshot displays the ORKG (Observatory Research Knowledge Gateway) interface. At the top, there is a navigation bar with the ORKG logo, links for 'Papers', 'Tools', and 'About', a search bar, and an 'Add paper' button. The main content area is titled 'Observatory' and features a search result for 'Occupants' perception and behaviour'. This result is broken down into three sections: 'Research Problems', 'Organizations', and 'Contributors'. The 'Research Problems' section lists '1. Indoor environmental perception and behaviour'. The 'Organizations' section shows logos for Northwestern University and Uniklinik RWTH Aachen. The 'Contributors' section lists Marcel Schweiker (Uniklinik RWTH Aachen) and Giorgia Chinazzo (Northwestern University). Below this, a 'Content' section includes a 'Comparisons' card for the same topic, indicating 4 contributions from 30-09-2020. Finally, a 'Papers' section lists two papers: 'The impact of thermal environment on occupant IEQ perception and productivity' by Yang Geng et al. (August 2017) and 'Interactions between the perception of light and temperature' by Marije te Kulve et al. (September 2018).

ORKG Papers Tools About Search... Add paper

### Observatory

#### Occupants' perception and behaviour

##### Research Problems

- Indoor environmental perception and behaviour

##### Organizations

Northwestern University

UNIKLINIK RWTH AACHEN

##### Contributors

Marcel Schweiker  
Uniklinik RWTH Aachen

Giorgia Chinazzo  
Northwestern University

### Content

#### Comparisons

Indoor environmental perception and behaviour

4 Contributions 30-09-2020

#### Papers

The impact of thermal environment on occupant IEQ perception and productivity

Yang Geng, Wenjie Ji, Borong Lin, Yingxin Zhu August 2017

Interactions between the perception of light and temperature

Marije te Kulve, Luc Schlangen, Wouter van Marken Lichtenbelt September 2018

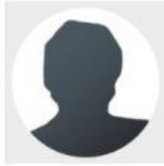
# behind the scenes

## The Awesome Team behind the ORKG

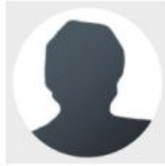
Sören Auer  
Lead



Vitalis Wiens  
PhD Student



Muhammad Haris  
PhD Student



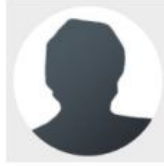
Jennifer D'Souza  
Researcher



Mohamad Yaser Jaradeh  
Developer



GoIsa Heidari  
PhD Student



Lars Vogt  
Researcher



Markus Stocker  
Co-Lead



Arthur Brack  
PhD Student



Allard Oelen  
Developer



Kheir Eddine Farfar  
Developer



Manuel Prinz  
Developer



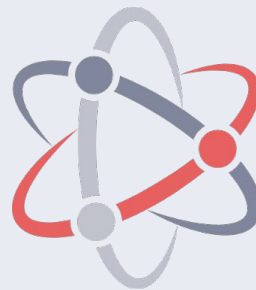
And many more ....

# Any questions?

Get your hands dirty now: [orkg.org](https://orkg.org)



Yaser Jaradeh ([jaradeh@l3s.de](mailto:jaradeh@l3s.de))



Open  
Research  
Knowledge  
Graph