Dimensions

New and Better insights into Open Science

Chicago 6 October 2019

Bo Alroe, Director of Strategy

Taking new approaches with new data from Dimensions

Part of DIGITAL science

Dimensions

The dawning of the era of context?

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Eras of research management

Research eras

- Era of Discovery (1950s - late 1990s) - Unaffected by evaluation, classic library use-cases
- Era of Metrics (early 2000s - now) - Evaluation, assessment, ranking optimisation
- Era of Context (dawning) - Data to *inform* (not drive) decisions

E.g. **discover** primary research to be up-to-date on the state of the art, knowing what to cite, seeing who in the community is engaging in which kind of research, who to contact to discuss a specific problem, etc.

Metrics are blunt tools (DORA, the Leiden Manifesto, the Metric Tide).

Users prefer visualisation or graphs over a single number. They want a search result but also to **contextualise** it to make the right interpretation. They want to drill down but also to be drawn across data (e.g. interactive visualisations), and complex narratives are valued, not reduced, in pursuit of understanding.

The Era of Metrics was the time of **reductionism** and the belief that data should drive rather than support decisions. The Era of Metrics is the era of the H-Index

"The five levels of scholarly search"
Daniel W. Hook, 2019

A brief history of the needs of scholars (WIP)

Search tools reflect their eras

Level	Era	Pricing Model	Example	Search type	Data	Content inclusion	Citation graph	Analytics
1	Discovery	Free	PubMed	Metadata only	Publications	Limited	Limited	-
2	Discovery	Subscription	Primo, Summon, WorldCat	Metadata only	Publications	Inclusive	Limited	-
3	Metrics	Subscription	Web of Science, Scopus	Metadata only	Publications, Patents, Data	Curated	Publications	InCites, SciVal
4	Metrics	Free	Google Scholar	Full Text	Publications	Inclusive	Publications	-
5	Context	Freemium	Dimensions	Full Text	Publications, Patents, Grants, Clinical Trials, Policy Documents, Datasets	Inclusive	Fully linked graph at object level + altmetrics	Integrated

Table 1: Five levels of scholarly search engine and their key characteristics

"The five levels of scholarly search"
Daniel W. Hook, 2019

A brief history of the needs of scholars

Publication - Article

The diagnosis of dementia due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease

Alzheimer's & Dementia, 7(3), 263-269, 2011
https://doi.org/10.1016/j.jalz.2011.03.005

Authors

Guy M. McKhann - Johns Hopkins University
Corresponding Author
David S. Knopman - Mayo Clinic
Howard Chertkow - McGill University; Jewish General Hospital
15 more

Abstract

The National Institute on Aging and the Alzheimer's Association charged a workgroup with the task of revising the 1984 criteria for Alzheimer's disease (AD) dementia. The workgroup sought to ensure that the revised criteria would be flexible enough to be used by both general healthcare providers without access to neuropsychological testing, advanced imaging, and cerebrospinal fluid measures, and specialized investigators involved in research or in clinical trial studies who would have these tools available. We present criteria for all-cause dementia and for AD dementia. We retained the general framework of probable AD dementia from the 1984 criteria. On the basis of the past 27 years of experience, we made several changes in the clinical criteria for the diagnosis. We also retained the term possible AD dementia, but redefined it in a manner more focused than before. Biomarker evidence was also integrated into the diagnostic formulations for probable and
more

Acknowledgements

The authors acknowledge the assistance of Dr. Cerise Elliott at the National Institute on Aging. Guy McKhann serves on a Data Safety Monitoring Board for Merck. David Knopman serves on a Data Safety Monitoring Board for Lilly Pharmaceuticals and is an investigator for clinical trials sponsored by Elan Pharmaceuticals, Forest Pharmaceuticals, and Baxter Healthcare; he is deputy editor of Neurology and receives compensation for editorial activities. Howard Chertkow serves as a consultant to Pfizer Canada, Lundbeck Canada, Janssen Ortho, Novartis Canada, and Bristol Myers Squibb; he receives a research grant from Pfizer Canada. Bradley Hyman serves as a consultant to EMD Serrano, Janssen, Takeda, BMS, Neurophage, Pfizer, Quanterix, foldrx, Elan, and Link, and receives funding from the NIH, the Alzheimer's Association, and Fidelity Biosciences. Clifford Jack serves as a consultant for Eli Lilly, Eisai, and Élan; he is an investigator in clinical trials sponsored by
more

Publication references - 24

Sorted by: Date

The diagnosis of mild cognitive impairment due to Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease

Marilyn S. Albert, Steven T. DeKosky, Dennis Dickson, Bruno Dubois, Howard H. Feldman, Nick C. Fox, Anthony Gamst, David M. Holtzman, William J. Jagust, Ronald C. Petersen, Peter J. Snyder, Mar...
2011, Alzheimer's & Dementia - Article

Citations 3.9k Altmetric 54 Open Access Add to Library

Open Access
Add to Library
Share
Export citation

Publication metrics

Dimensions Badge

5.2k
5.2k Total citations
1.8k Recent citations
915 Field Citation Ratio
215 Relative Citation Ratio

Altmetric

57
News (1)
Blogs (4)
Policy documents (1)
Twitter (11)
Patents (21)
Facebook (1)
Mendeley (4123)
CiteULike (9)

Funded by

Pfizer (United States)
Johnson & Johnson (United States)
Eli Lilly (United States)
Baxter (United States)
Eisai (Japan)
National Institute on Aging
Takeda (United States)
Bristol-Myers Squibb (United States)
Alzheimer's Association
Lundbeck (Denmark)

Research Categories

Toward defining the preclinical stages of Alzheimer's disease: Recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease

Reisa A. Sperling, Paul S. Aisen, Laurel A. Beckett, David A. Bennett, Suzanne Craft, Anne M. Fagan, Takeshi Iwatsubo, Clifford R. Jack, Jeffrey Kaye, Thomas J. Montine, Denise C. Park, Eric M. Reim...

2011, Alzheimer's & Dementia - Article

Citations 3.1k Altmetric 136 Open Access Add to Library

Introduction to the recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease

Clifford R. Jack, Marilyn S. Albert, David S. Knopman, Guy M. McKhann, Reisa A. Sperling, Maria C. Carrillo, Bill Thies, Creighton H. Phelps

2011, Alzheimer's & Dementia - Article

Citations 880 Altmetric 12 Open Access Add to Library

Classification of primary progressive aphasia and its variants(e–Pub ahead of print)

M.L. Gorno-Tempini, A.E. Hillis, S. Weintraub, A. Kertesz, M. Mendez, S.F. Cappa, J.M. Ogar, J.D. Rohrer, S. Black, B.F. Boeve, F. Manes, N.F. Dronkers, R. Vandenberghe, K. Rascovsky, K. Patterson, B.L....

2011, Neurology - Article

Citations 1.9k Altmetric 29 Open Access Add to Library

Age, Alzheimer's disease and dementia in the Baltimore Longitudinal Study of Ageing

David Dolan, Juan Troncoso, Susan M. Resnick, Barbara J. Crain, Alan B. Zonderman, Richard J. O'Brien

2010, Brain - Article

Citations 54 Open Access Add to Library

More

Supporting grants - 1

Sorted by: Start Date Funding amount (USD), Funding period

Johns Hopkins Alzheimer's Disease Research Center

37,568,236

1984 - 2020

National Institute on Aging

to MARILYN S. ALBERT, VASSILIS E KOLIATSOS, PETER J WHITEHOUSE, RICHARD J O'BRIEN, NANCY A MUMA, LEE J MARTIN, DAVID S OLTON, BARRY GORDON, J. LY...

Research Categories

Fields of Research

11 Medical and Health Sciences

1109 Neurosciences

Research, Condition, and Disease Categorizations

Aging

Alzheimer's Disease

Neurosciences

Acquired Cognitive Impairment

Alzheimer's Disease including Alzheimer's Disease Related Dementias (AD/ADRD)

Brain Disorders

Clinical Research

Dementia

Neurodegenerative

Prevention

Health Category (HRCS)

Neurological

Research Activity Codes (HRCS)

4.1 Discovery and preclinical testing of markers and technologies

MeSH terms

Alzheimer Disease; Biomarkers; Diagnosis, Differential; Diagnostic Imaging; Disease Progression; Humans; National Institute on Aging (U.S.); Practice Guidelines as Topic; Societies, more

External sources

↗Full text at publisher site

↗Abstract at PubMed

↗Full text at PMC

Publication citations - 5208 Show all

Sorted by: Date

Kallikrein-related peptidases 6 and 10 are elevated in cerebrospinal fluid of patients with Alzheimer's disease and associated with CSF-TAU and FDG-PET

Oliver Goldhardt, Inanna Warnhoff, Igor Yakushev, Ilijana Begcevic, Hans Förstl, Viktor Magdolen, Antoninus Soosaipillai, Eleftherios Diamandis, Panagiotis Alexopoulos, Timo Grimmer

2019, Translational Neurodegeneration - Article

View PDF Add to Library

Depression, subjective cognitive decline, and the risk of neurocognitive disorders

Tau Ming Liew

2019, Alzheimer's Research & Therapy - Article

Altmetric 2 View PDF Add to Library

A circuit view of deep brain stimulation in Alzheimer's disease and the possible mechanisms

Danfang Yu, Huanhuan Yan, Jun Zhou, Xiaodan Yang, Youming Lu, Yunyun Han

2019, Molecular Neurodegeneration - Article

Altmetric 11 View PDF Add to Library

The neuropathological diagnosis of Alzheimer's disease

Michael A. DeTure, Dennis W. Dickson

2019, Molecular Neurodegeneration - Article

Altmetric 13 View PDF Add to Library

Late-stage Anle138b treatment ameliorates tau pathology and metabolic decline in a mouse model of human Alzheimer's disease tau

Matthias Brendel, Maximilian Deussing, Tanja Blume, Lena Kaiser, Federico Probst, Felix Overhoff, Finn Peters, Barbara von Ungern-Sternberg, Sergey Ryazanov, Andrei Leonov, Christian Griesinger, ...

2019, Alzheimer's Research & Therapy - Article

Altmetric 17 View PDF Add to Library

More

Patent citations - 20

Sorted by: Date

MELANOTRANSFERRIN FOR USE IN THE DIAGNOSIS OF PARKINSON`S DISEASE

GEROA DIAGNOSTICS S L - ORIVE ARROYO, GORKA, CARRO DIAZ, Eva María, DEL CASTILLO TAMAYO, JUAN CARLOS

Application WO - Filed year: 2017

METHODS OF DIAGNOSING AND TREATING ALZHEIMER'S DISEASE WITH S-EQUOL

AUSIO PHARMACEUTICALS LLC - JACKSON, RICHARD L.

Application WO - Filed year: 2017

AN OXAZINE DERIVATIVE FOR USE IN THE PREVENTION OF ALZHEIMER'S DISEASE IN AT RISK PATIENTS

NOVARTIS AG - LOPEZ-LOPEZ, Cristina, NEUMANN, ULF

Application WO - Filed year: 2017

ASSAY FOR THE DIAGNOSIS OF A NEUROLOGICAL DISEASE

EUROIMMUN MEDIZINISCHE LABORDIAGNOSTIKA AG - ADX NEUROSCIENCES NV, VANMECHELEN, EUGEEN, DE VOS, Ann, ENGELBORGHS, Sebastiaan, PETERS, OLIVER, SCHIPKE, Carola

Application WO - Filed year: 2017

MICRORNA BIOMARKERS IN BLOOD FOR DIAGNOSIS OF ALZHEIMER'S DISEASE

INST BIOLOGII DOSWIADCZALNEJ IM MARCELEGO NENCKIEGO POLSKA AKADEMIA NAUK, BIOTECH INNOVATIONS SPÓLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA - WOJDA, URSZULA, LASK...

Application WO - Filed year: 2017

More

Clinical trial citations - 7

Sorted by: Date Trial period

Levetiracetam for Alzheimer's Disease Neuropsychiatric Symptoms Related to Epilepsy Trial (LAPSE) - A Phase II Exploratory Study — 2020 - 2025
Walter Reed National Military Medical Center

Evaluation of Alzheimer's Biomarkers in Cerebrospinal Fluid and Peripheral Blood of Elderly Patients Undergoing Surgery in the HCUCH. — 2019 - 2020
University of Chile

Phase 1/2 Open Single-arm Monocentric Study Evaluating the Tolerance and Interest of Transient Opening of the Blood-Brain Barrier by Low Intensity Pulsed Ultrasound With the SONOCLOUD® Implantable Medical Device in Mild Alzheimer's Disease Patients (MMSE 20-26) — 2017 - 2019
Assistance Publique -Hopitaux De Paris

Imaging Dementia—Evidence for Amyloid Scanning (IDEAS) Study: A Coverage With Evidence Development Longitudinal Cohort Study — 2016 - 2017
American College of Radiology Imaging Network
Altmetric 42

A 6 Month, Open-Label, Pilot Futility Clinical Trial of Monthly Young Healthy Male Donor Plasma Transfusions for Progressive Supranuclear Palsy — 2015 - 2019
University of California, San Francisco
Altmetric 43

More

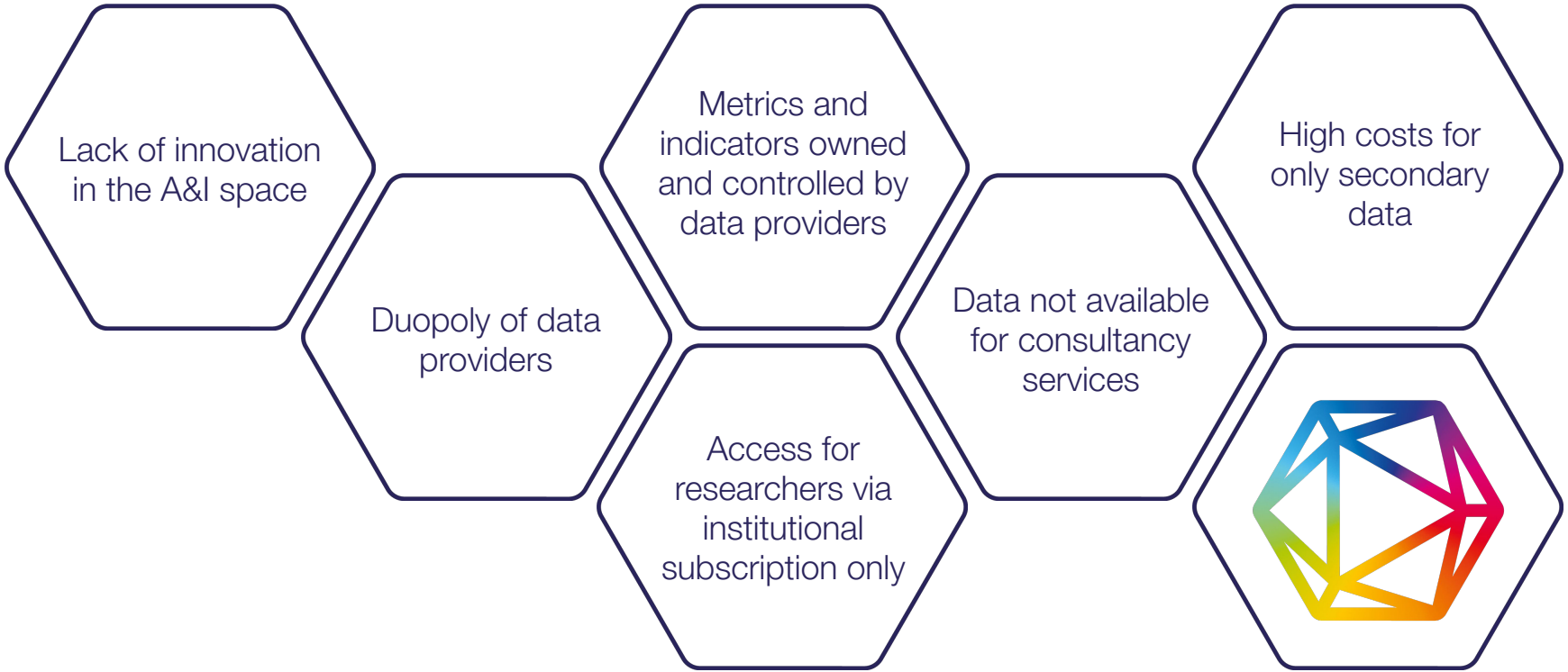
This is freely + openly available to researchers without creating an account.
app.dimensions.ai

Dimensions

Background

Part of DIGITAL science

What prompted us to develop Dimensions?



Six Digital Science companies worked together

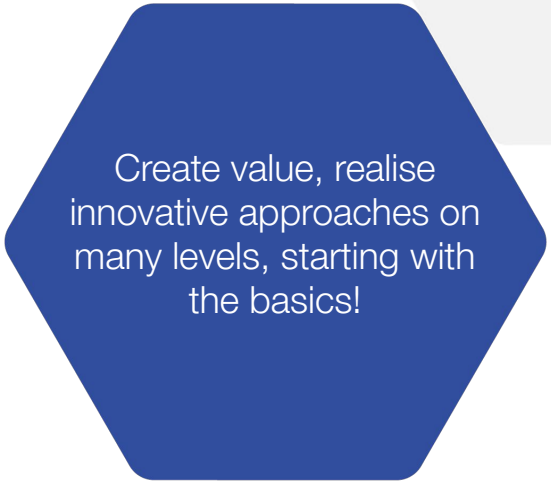
We worked with 100+ global development partners

Our partners offered important insights:

- Actual needs in research discovery, administration, and management
- Needs within different disciplines
- Regional differences
- Best practises

The ambitions for Dimensions - created with those partners

- Better context for scholarly work
- As free + open as possible
- Full text search
- Modern application + integrated analyses + API
- Fast access to read full text
- Inclusive approach to data (no exclusion of low-cited work)
- Editorial process against predatory/fraudulent journals
- Give users tools to decide what's relevant
- Interlinked data



Key aspects we wanted to change

Data in Dimensions

What Digital Science already had on the shelves ...

Publications (1/2) - Publication metadata backbone

PUBLICATIONS

- Journal articles, pre-prints and books/chapters
- 100M + records based on metadata
- Metadata and citations derived from multiple available databases
- OA tagging
- Rule-based document type identification

JOURNALS / BOOKS	PRE-PRINT / OA	Pipeline 2019/20
Crossref	bioRxiv beta THE PREPRINT SERVER FOR BIOLOGY	arXiv.org
PubMed	SSRN Tomorrow's Research Today	RePEc
Europe PMC	PeerJ	Japan Link Center
J-STAGE	ChemRxiv™	

Publications (2/2) - Full text processing

PUBLICATIONS

- Full text for 70M+ publications currently
- Direct relationships with >130 publishers
- Increased discoverability through
  - Full text index
  - Openly available discovery interface
- Highly contextualised
  - Related grants, publication references, related trials, related patents, related policy documents
  - Improved representation compared to the ‘backbone’ records

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The metrics in Dimensions - close to the data

I4OC citations + own reference extraction

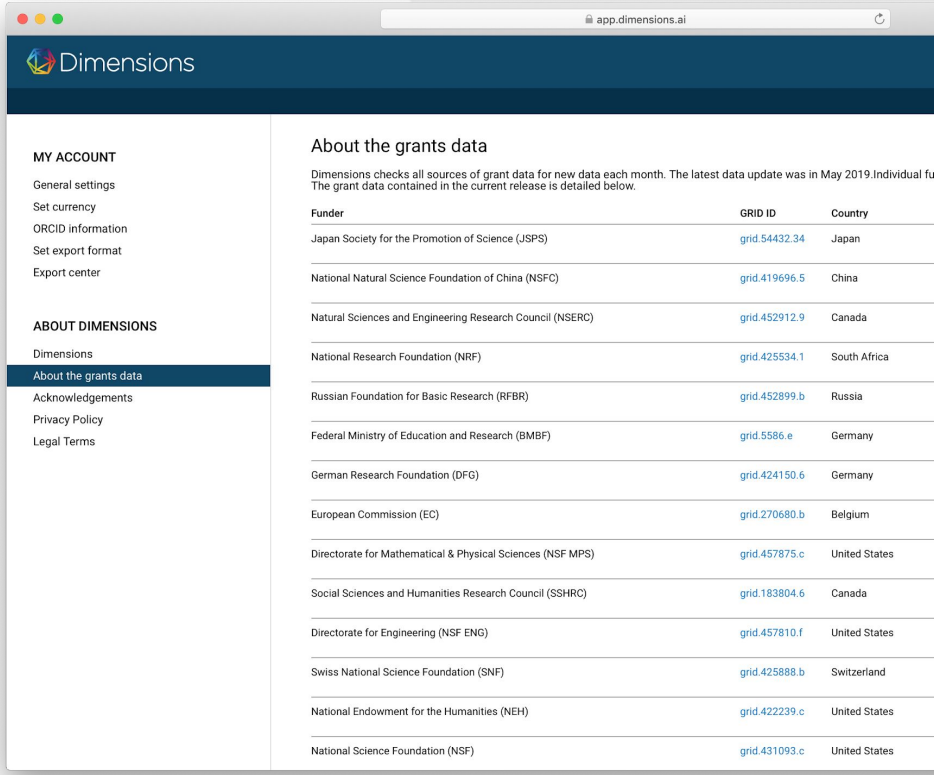
…with an invitation to the bibliometric community to do research on innovative metrics on the Dimensions data and tool platform since Digital Science does not want to impose new metrics

* planned for future release

Grants data

GRANTS

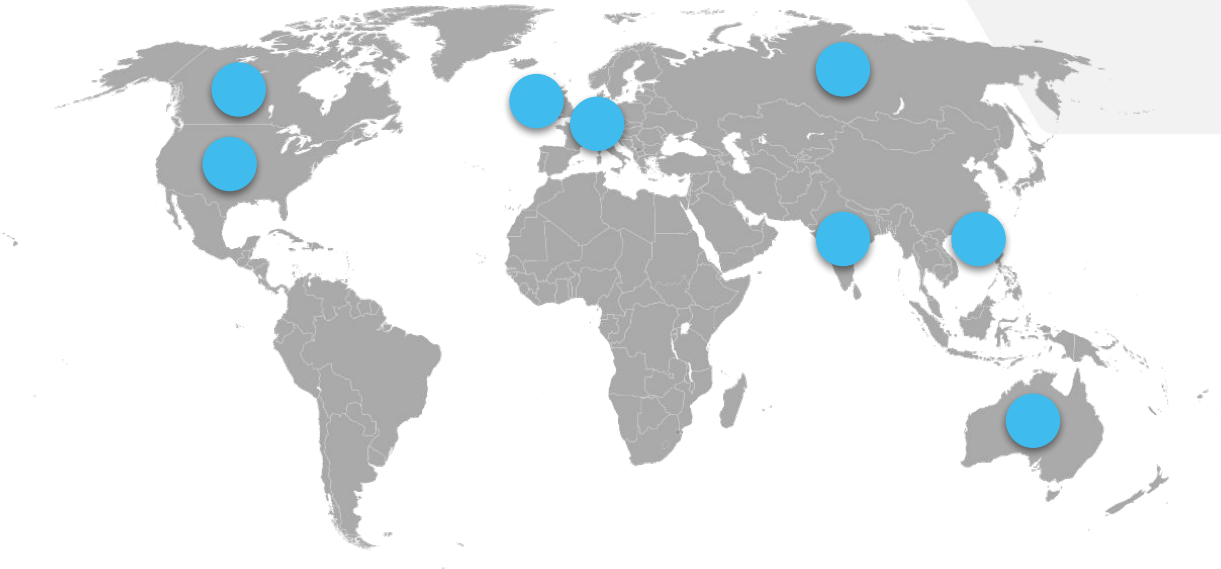
- Project funding
- 5M grants from +430 funders globally
- $1.5 trillion of funding
- Sourcing
  - Direct relationships with funders
  - Data available via APIs
  - Data available via websites which we crawl



Patents data

PATENTS

- US
- EP
- WIPO
- DE
- CA
- IN
- AU
- GB
- FR
- Hong Kong
- Russia



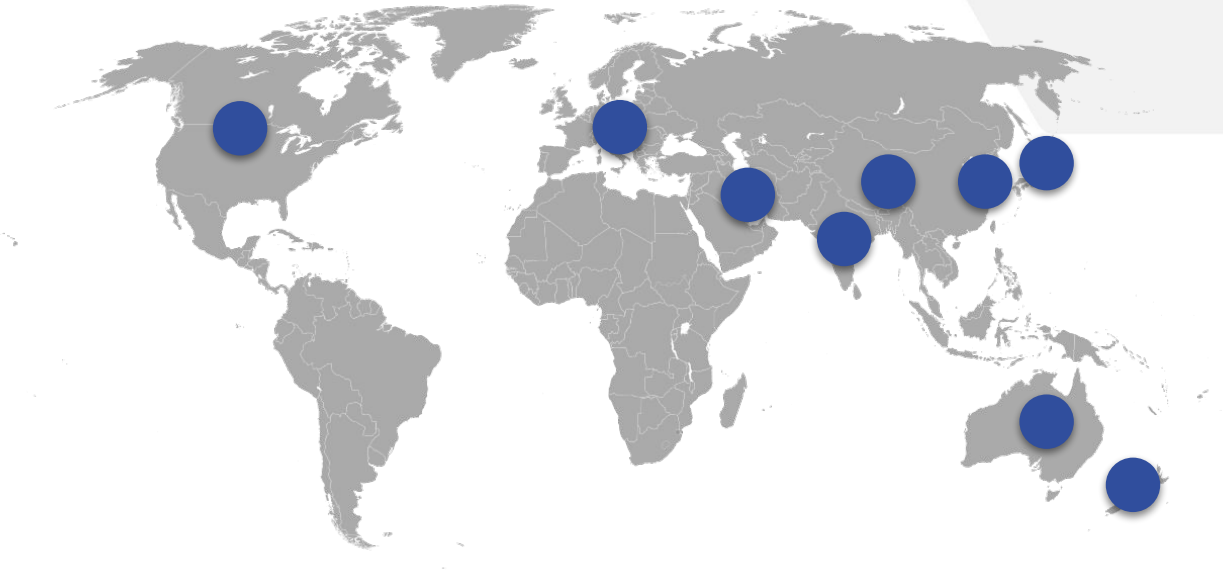
…China/Japan will be the next to be added.

Clinical trials data

CLINICAL TRIALS

- ClinicalTrials.gov
- EU-CTR
- UMIN-CTR
- ISRCTN
- ANZCTR
- CHICTR
- NTR
- GCTR
- CTRI
- CRIS
- IRCT

… and more are coming



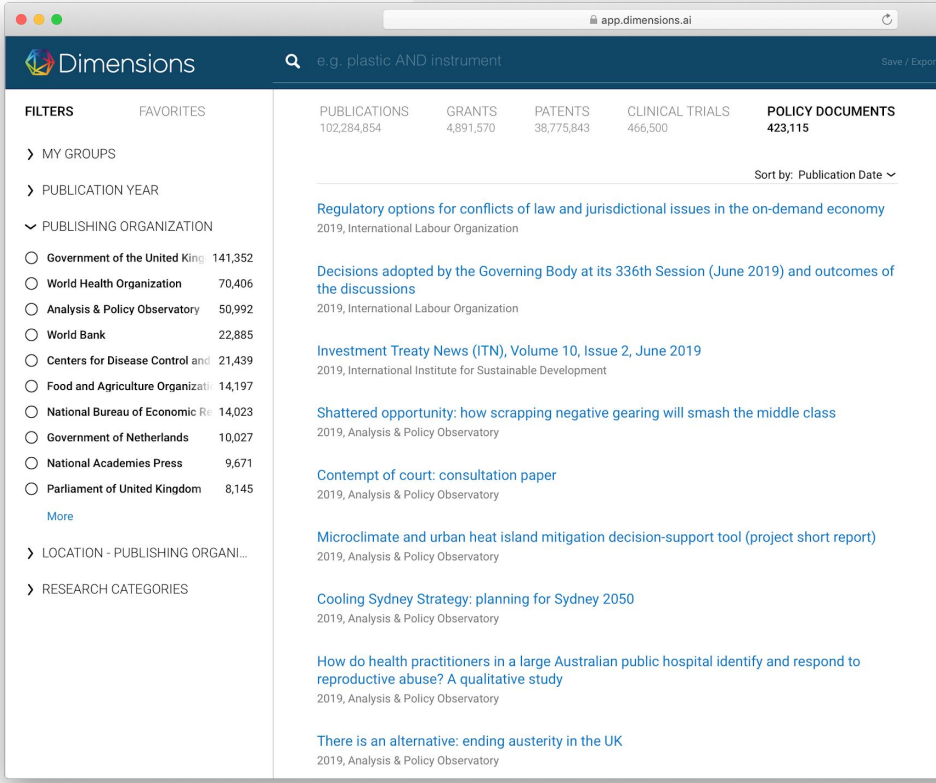
Policy documents data

POLICY DOCUMENTS

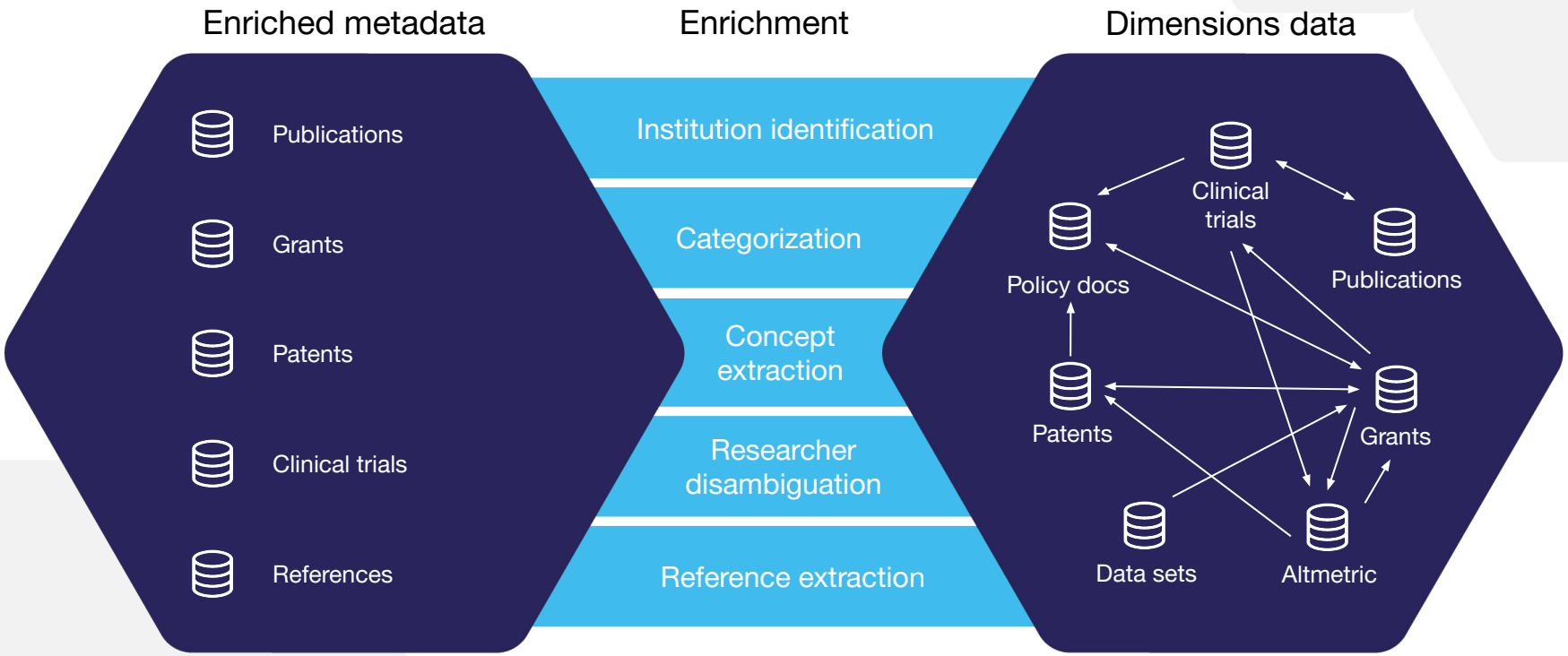
Over 400,000 policy document records, linked to publications

Including but not limited to:

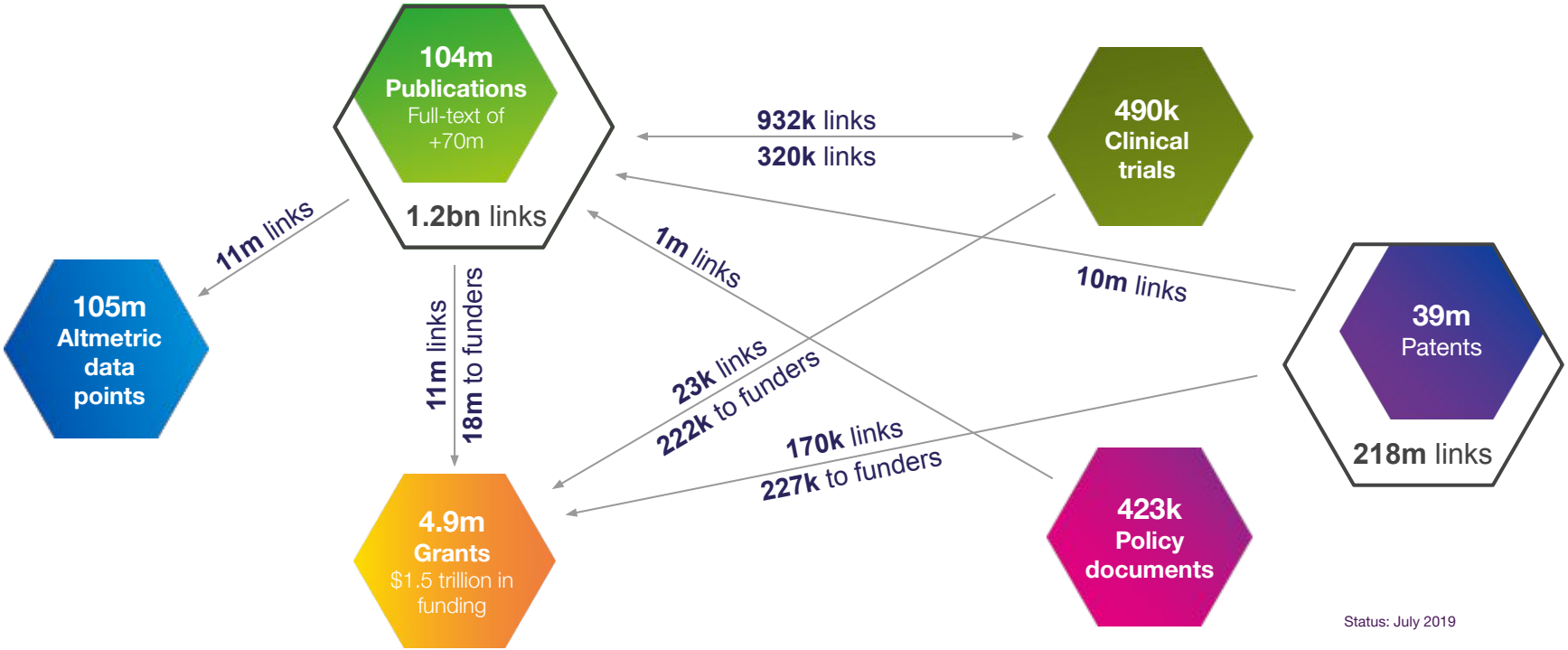
- World Health Organization
- World Bank
- Centers for Disease Control & Prevention
- Government of the United Kingdom
- National Bureau of Economic Research



Processing: Enriching + interlinking

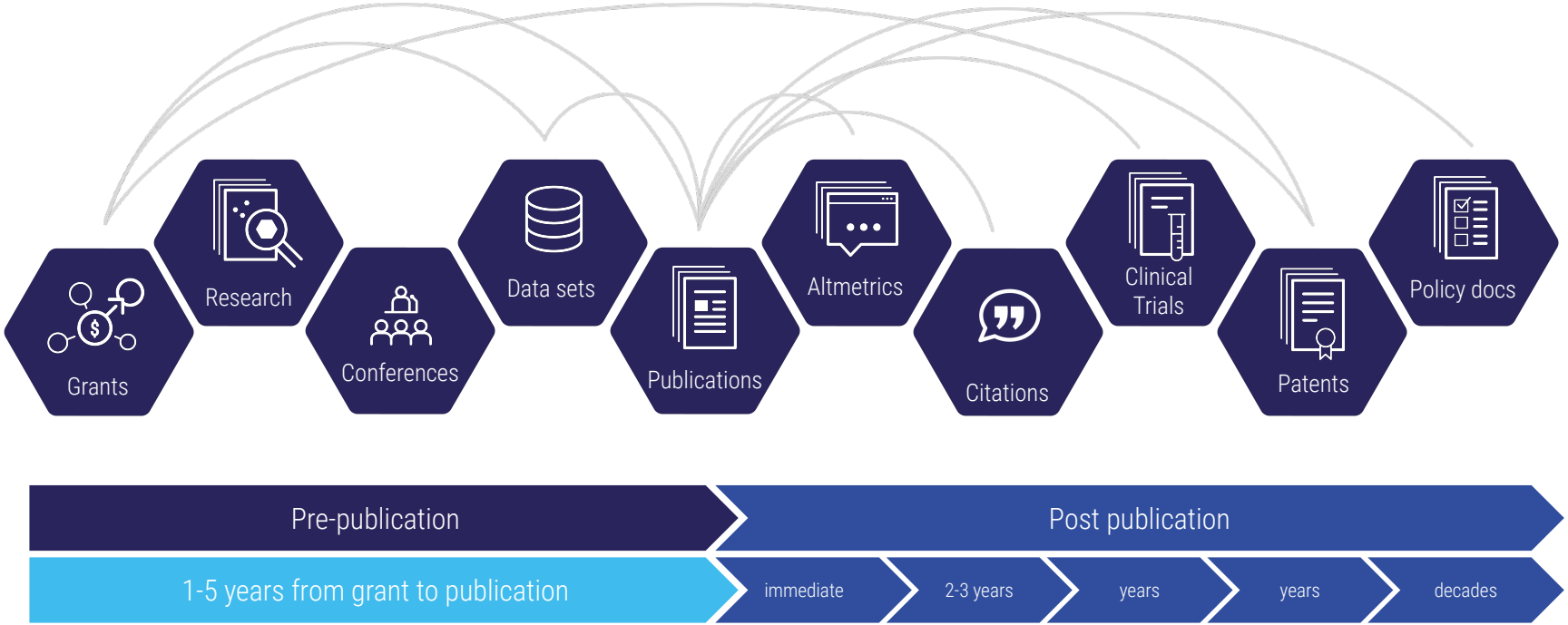


The final result

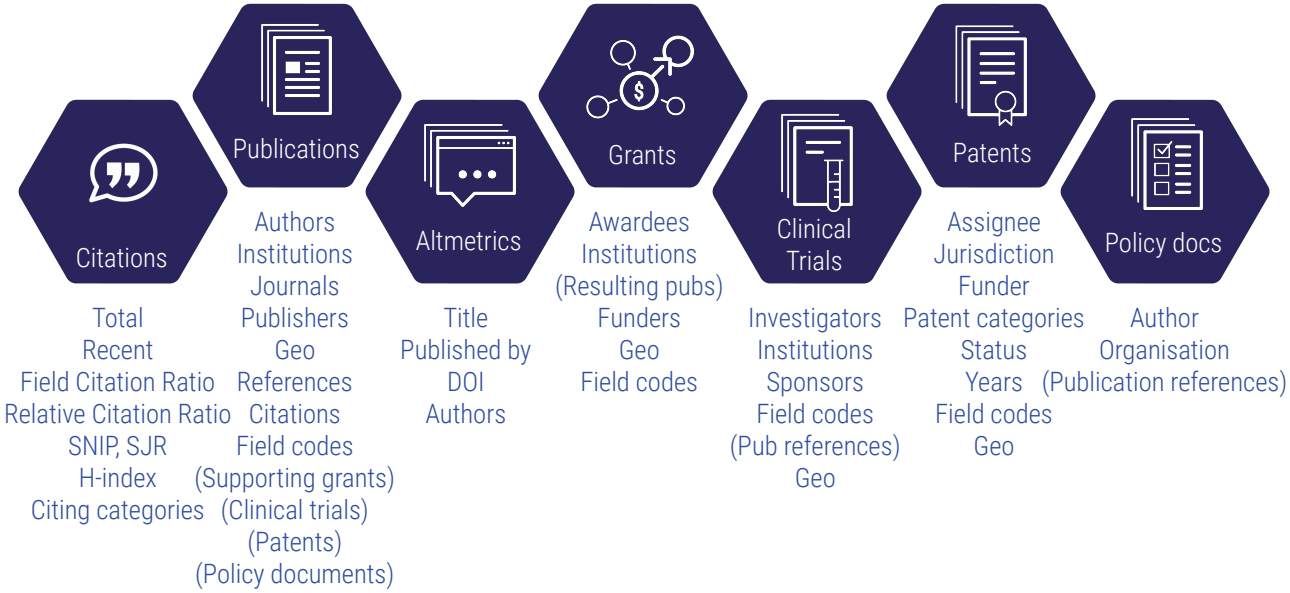


Richer context

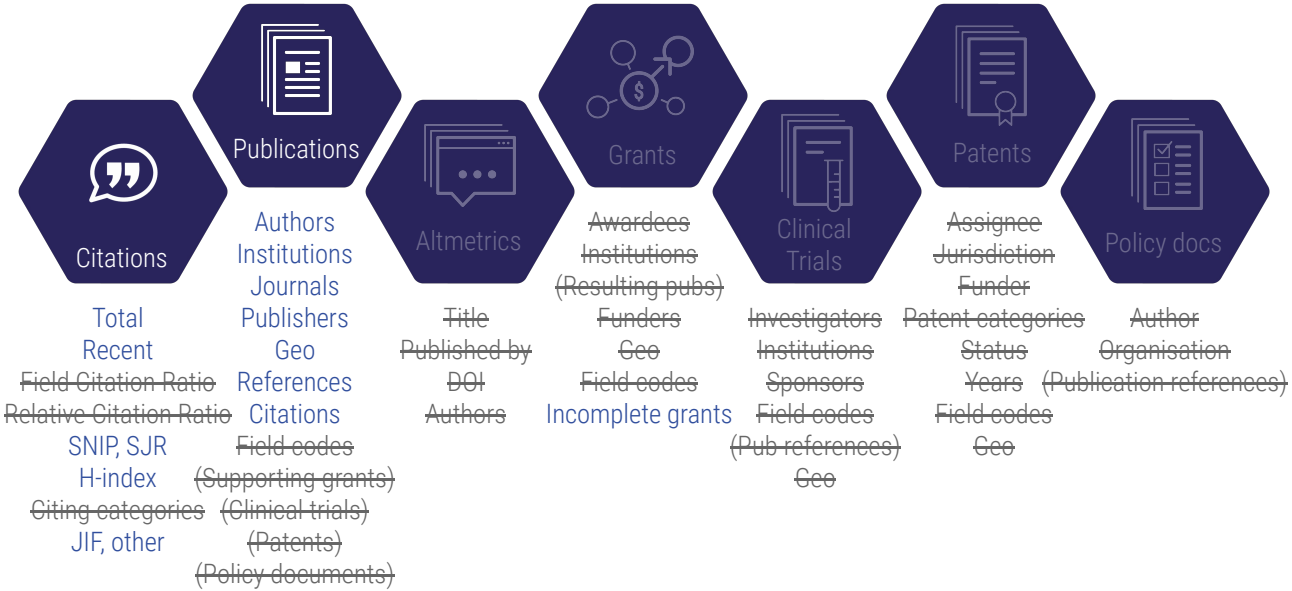
Richer context



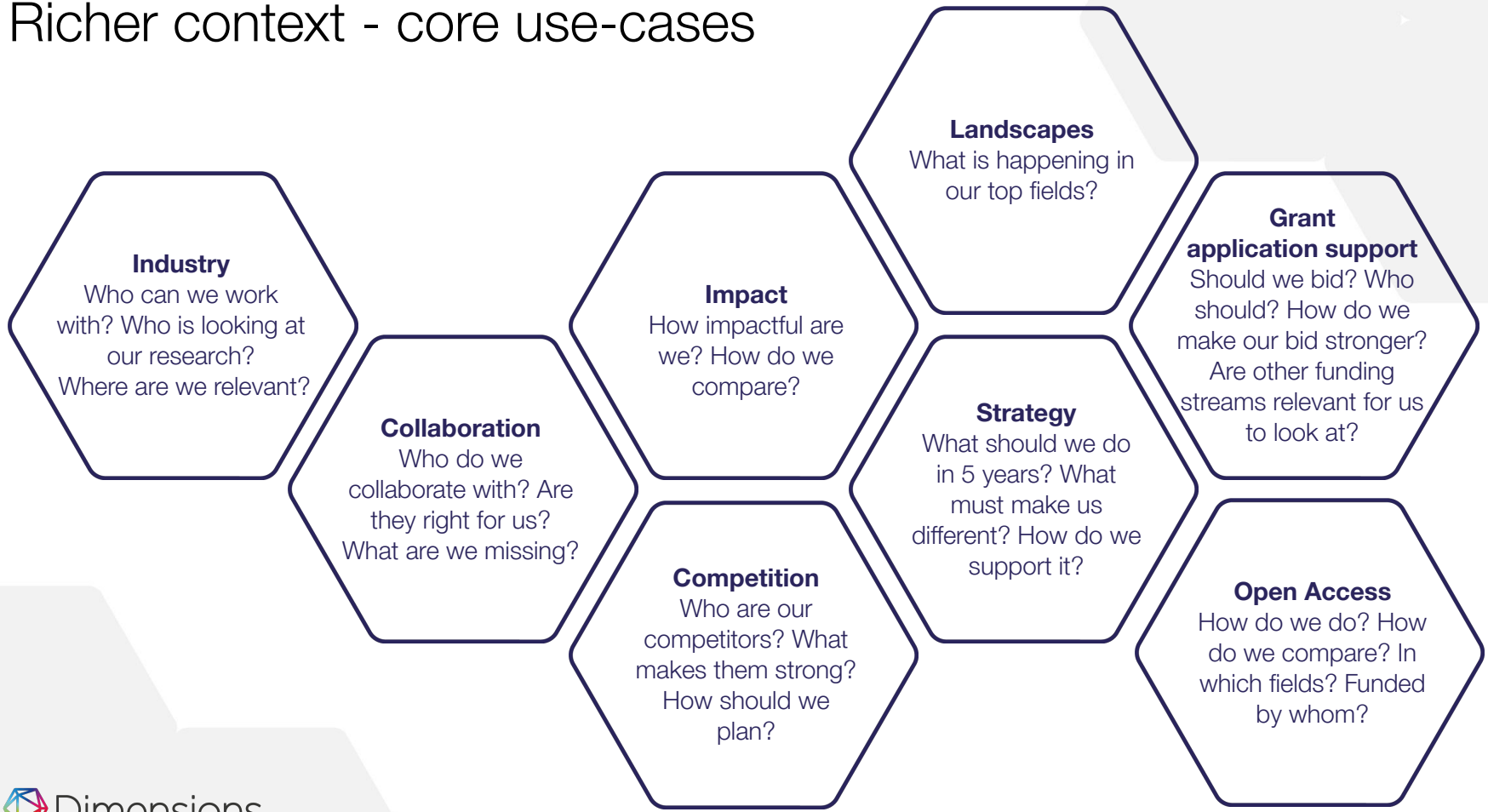
Richer context



Richer context - quick comparison to traditional databases

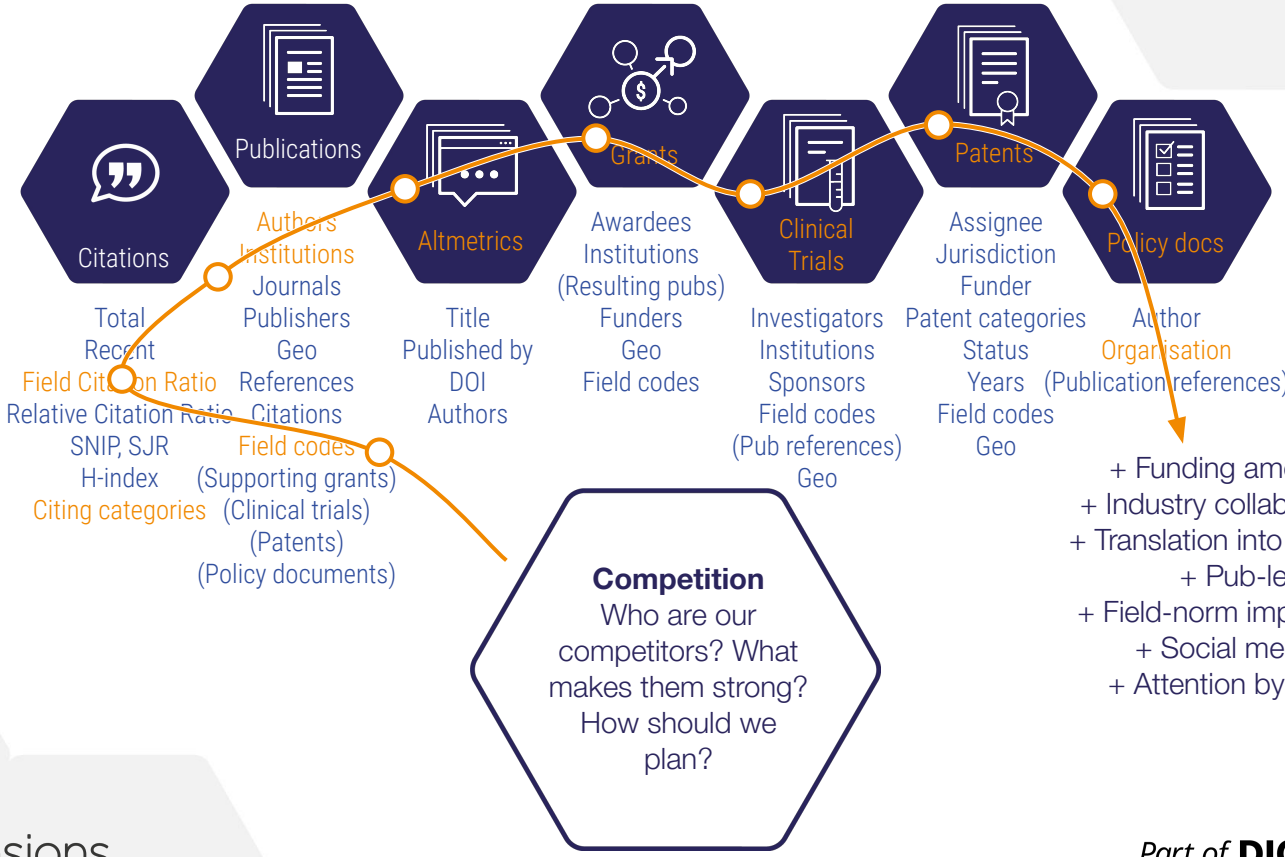


Richer context - core use-cases



Dimensions

Richer context - why it matters



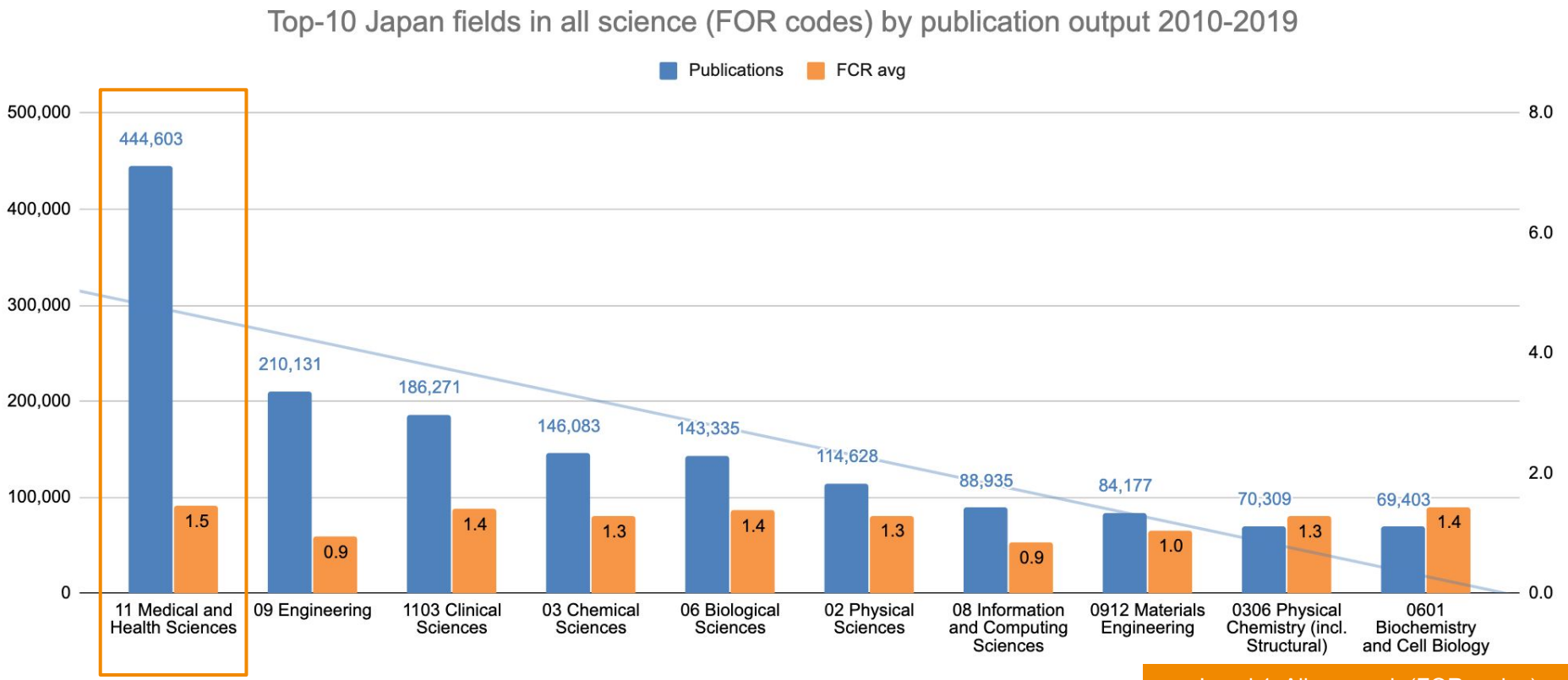
Sample analyses (excerpts) about context

Multiple categorisation systems

All records in Dimensions are classified with these classification systems:

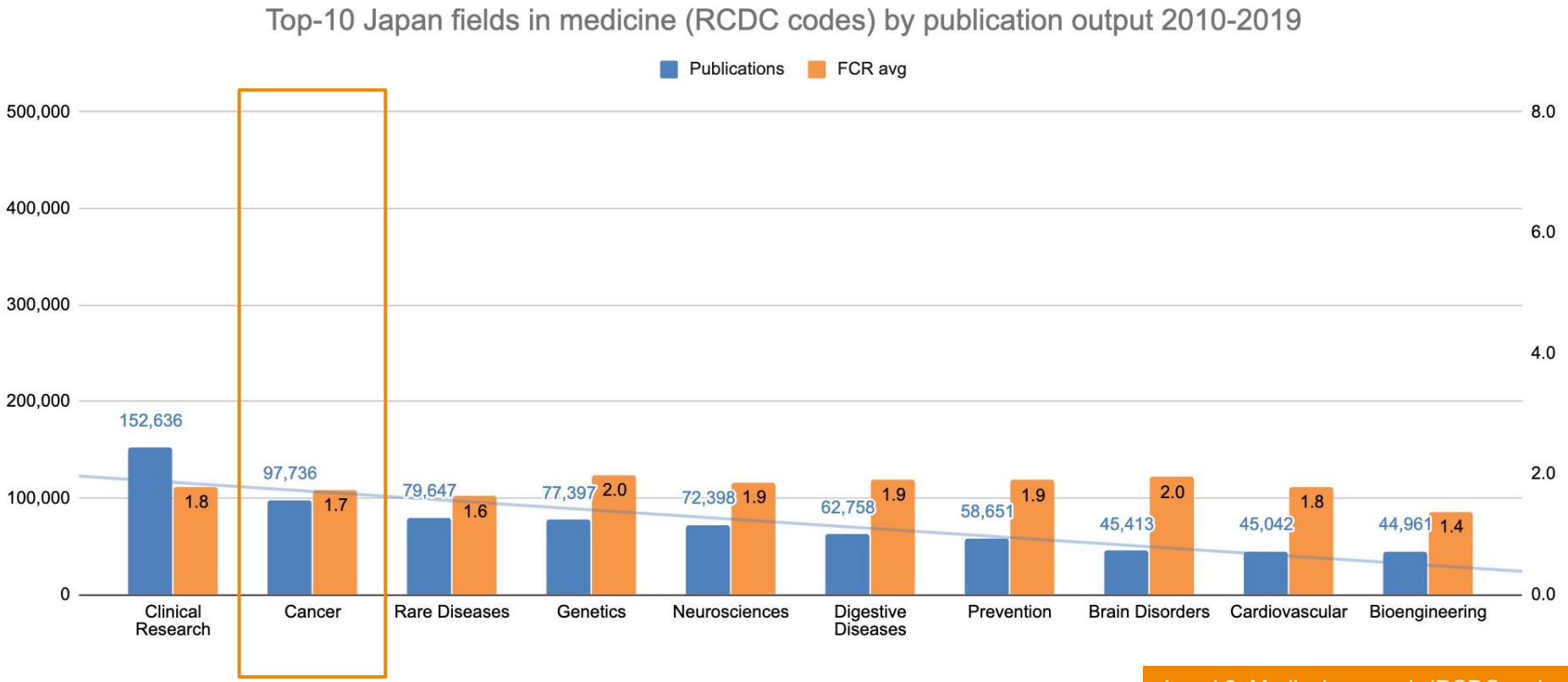
- FIELDS OF RESEARCH (FOR)
- RESEARCH, CONDITION, AND DISEASE CATEGORIZATION (RCDC)
- HEALTH CATEGORY (HRCS)
- RESEARCH ACTIVITY CODES (HRCS)
- ICRP CANCER TYPES
- ICRP COMMON SCIENTIFIC OUTLINE (CSO)
- MeSH terms
- (NOT **KAKEN** AT THIS POINT)

Published fields in Japan's research (2010-2019)



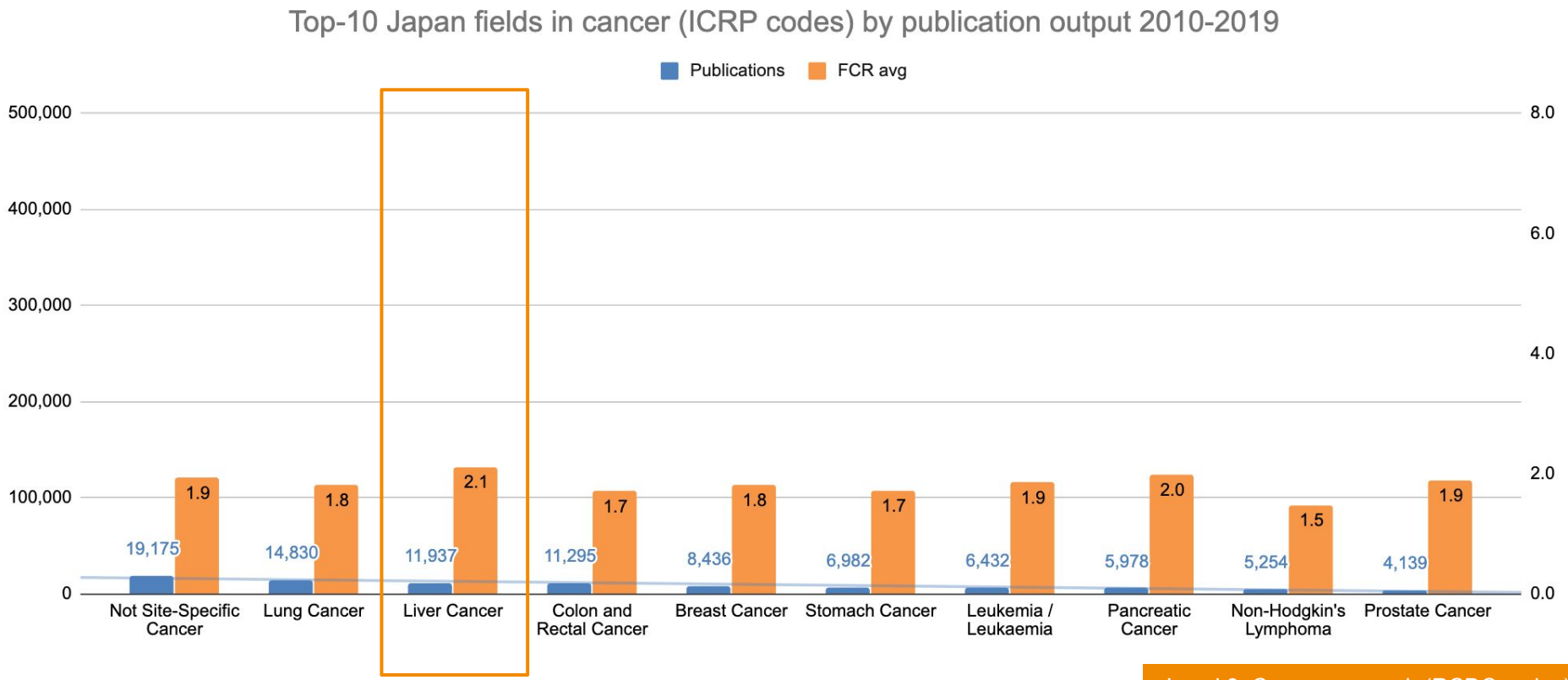
Level 1: All research (FOR codes)

Published fields in Japan's research (2010-2019)



Level 2: Medical research (RCDC codes)

Who funded Japan's research? (2010-2019)



Level 3: Cancer research (RCDC codes)

The point?

Article-level classifications gives you the overview you need.

What would your institution’s field-overview look like?

Who funds Illinois research?

Name	Country	Grants	Amount
Directorate for Computer & Information Science & Engineering (NSF CISE)	United States	991	$858.9M
National Cancer Institute (NCI)	United States	656	$696.9M
Directorate for Mathematical & Physical Sciences (NSF MPS)	United States	1,382	$612.3M
National Heart Lung and Blood Institute (NHLBI)	United States	483	$534.0M
National Institute of General Medical Sciences (NIGMS)	United States	407	$509.4M
National Institute of Allergy and Infectious Diseases (NIAID)	United States	527	$483.7M
Directorate for Education & Human Resources (NSF EHR)	United States	362	$365.7M
Centers for Disease Control and Prevention (CDC)	United States	132	$348.0M
National Institute of Neurological Disorders and Stroke (NINDS)	United States	407	$345.0M
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)	United States	310	$344.8M
Directorate for Engineering (NSF ENG)	United States	934	$314.7M
National Institute of Child Health and Human Development (NICHD)	United States	292	$278.2M
National Institute on Aging (NIA)	United States	231	$277.8M
National Institute of Mental Health (NIMH)	United States	225	$261.8M
Engineering and Physical Sciences Research Council (EPSRC)	United Kingdom	100	$256.3M
Office of Science (DOE SC)	United States	206	$215.4M
European Commission (EC)	Belgium	58	$203.2M
Directorate for Biological Sciences (NSF BIO)	United States	424	$180.0M
National Energy Technology Laboratory (NETL)	United States	33	$174.4M

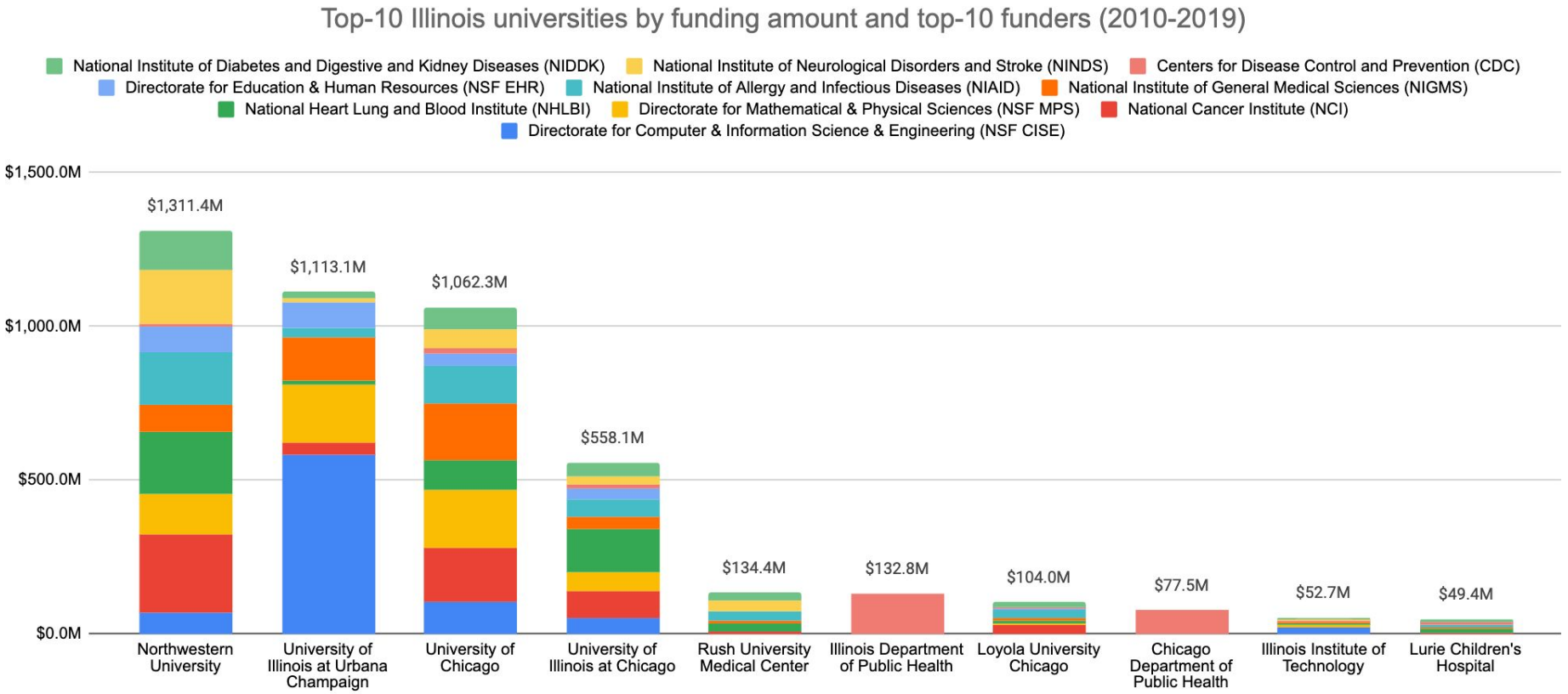
Who receives that funding?

Name	Country	Grants	Amount
Northwestern University (NU)	United States	3,587	$2,646.1M
University of Illinois at Urbana Champaign (UIUC)	United States	3,286	$2,003.6M
University of Chicago (UC)	United States	2,492	$1,838.3M
University of Illinois at Chicago (UIC)	United States	1,729	$1,151.9M
Rush University Medical Center	United States	298	$307.7M
Illinois Department of Public Health (IDPH)	United States	50	$257.6M
University of Illinois System	United States	259	$211.9M
National Opinion Research Center (NORC)	United States	95	$186.7M
University of Oxford	United Kingdom	67	$170.4M
Argonne National Laboratory (ANL)	United States	97	$166.9M
Gas Technology Institute (GTI)	United States	34	$158.8M
Illinois Institute of Technology (IIT)	United States	292	$153.2M
Loyola University Chicago (LUC)	United States	274	$147.9M
Chicago Department of Public Health (CDPH)	United States	19	$134.9M
University of Cambridge	United Kingdom	66	$119.2M
University of Manchester	United Kingdom	36	$101.7M
Imperial College London	United Kingdom	45	$91.1M
Rehabilitation Institute of Chicago (RIC)	United States	91	$87.7M
University College London (UCL)	United Kingdom	50	$87.1M

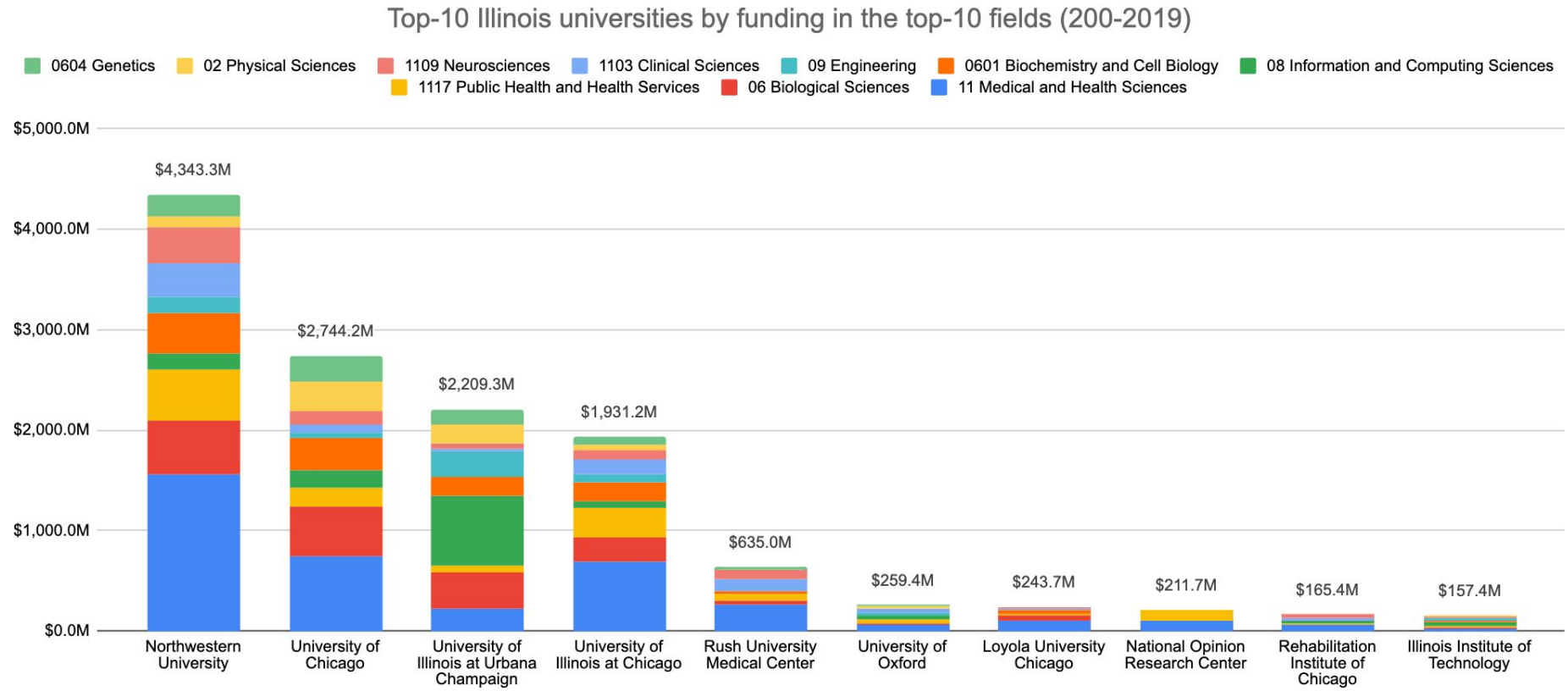
Which fields are more funded?

Name	Field (FOR)	Grants	Amount
Medical and Health Sciences	11	4,848	$4,352.7M
Biological Sciences	06	2,721	$1,906.6M
Engineering	09	1,729	$1,108.4M
Information and Computing Sciences	08	1,645	$1,415.0M
Biochemistry and Cell Biology	0601	1,624	$1,225.9M
Public Health and Health Services	1117	1,299	$1,493.9M
Physical Sciences	02	1,134	$877.0M
Chemical Sciences	03	1,104	$678.3M
Neurosciences	1109	1,075	$887.5M
Genetics	0604	1,052	$822.0M
Clinical Sciences	1103	965	$889.1M
Artificial Intelligence and Image Processing	0801	937	$738.1M
Mathematical Sciences	01	926	$275.4M
Psychology and Cognitive Sciences	17	894	$692.9M
Psychology	1701	883	$689.8M
Materials Engineering	0912	864	$526.2M
Physical Chemistry (incl. Structural)	0306	843	$526.8M
Other Physical Sciences	0299	698	$580.4M
Information Systems	0806	662	$773.9M

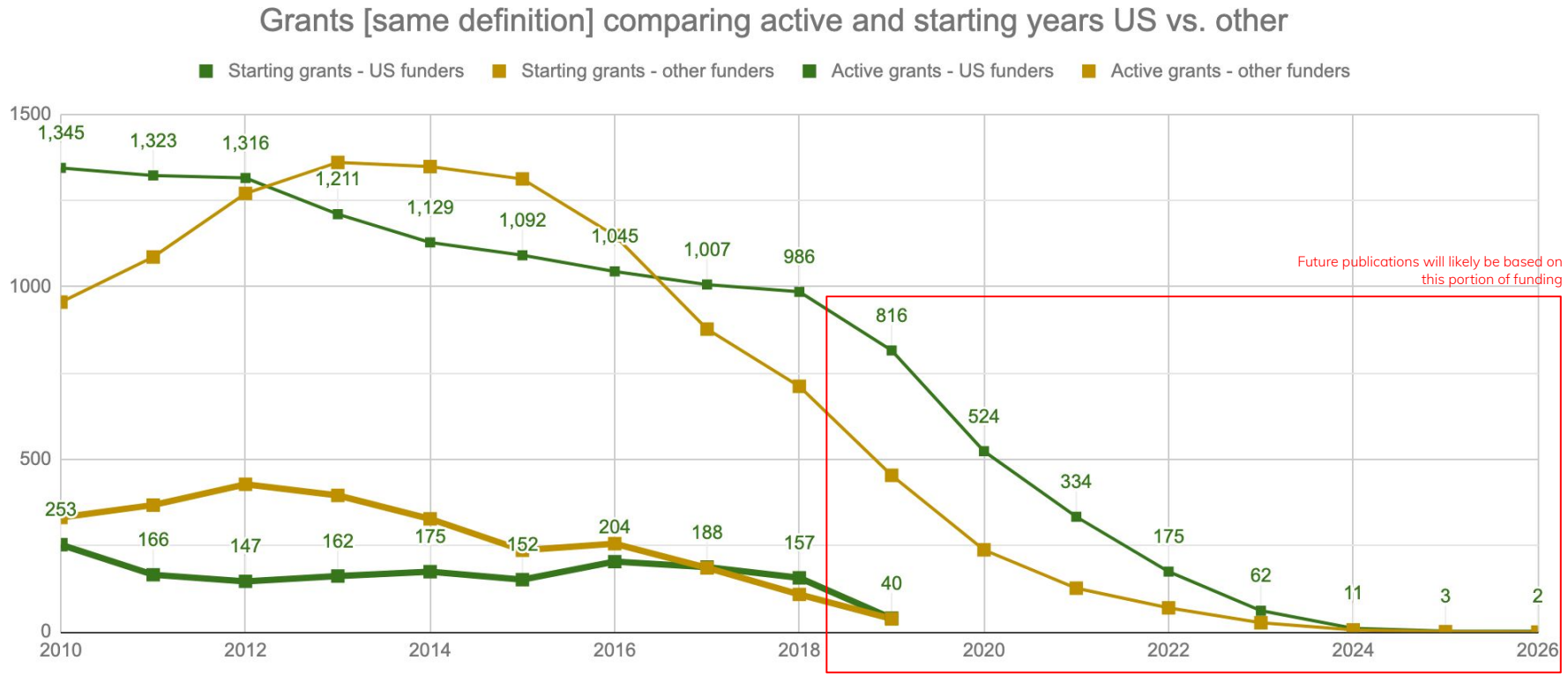
Top-10 Illinois universities and funders



Top-10 Illinois universities and fields



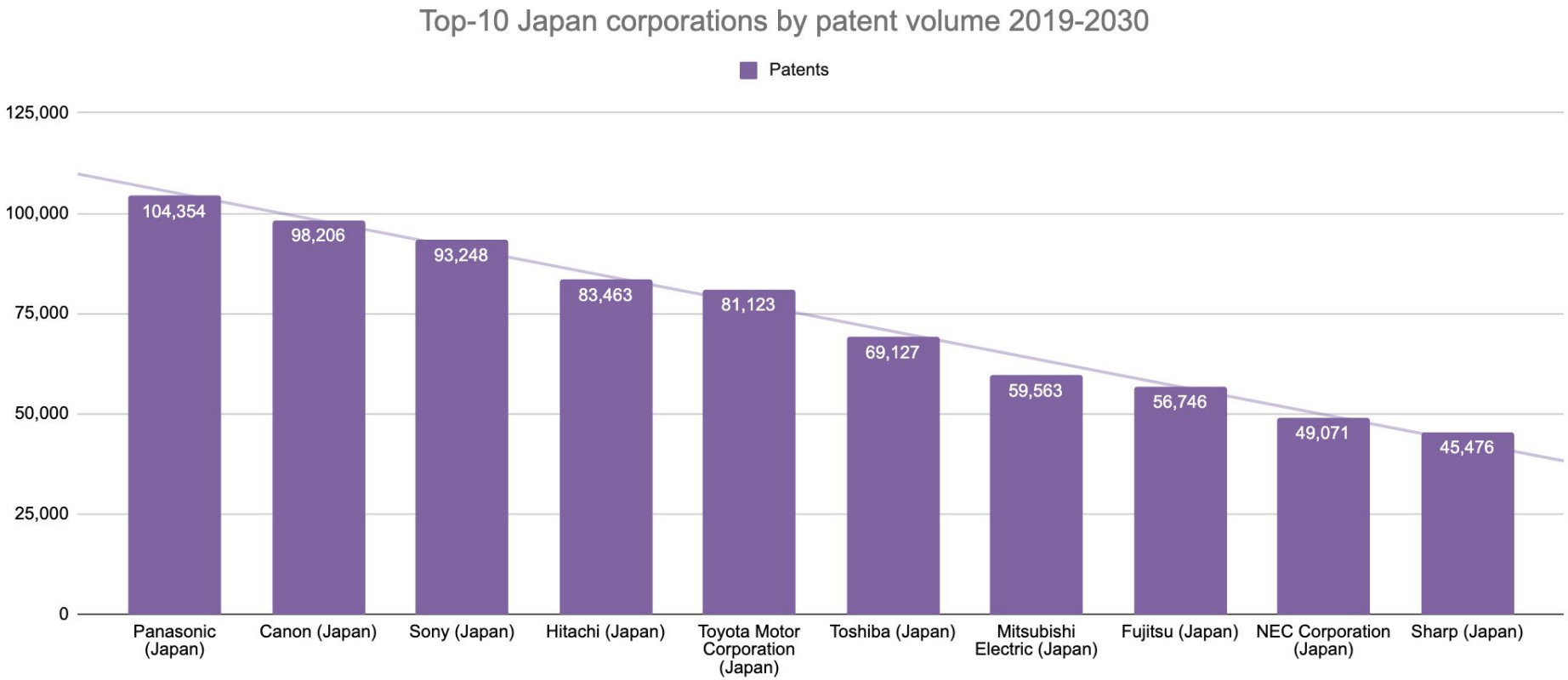
Funding of Coronary Artery Disease (NEJM)



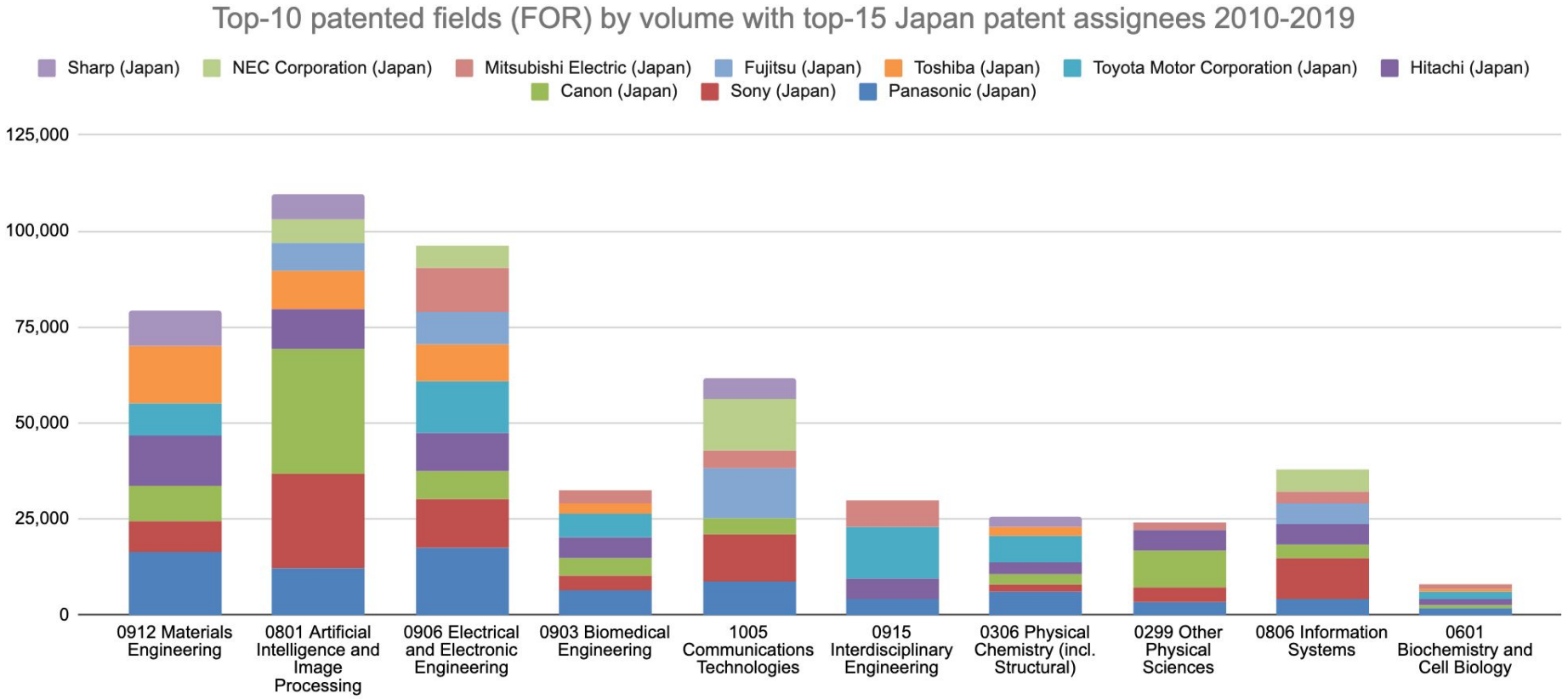
The point?

Money matters in research. Without that context, some analyses become very one-legged.

Who owns Japan's patents?



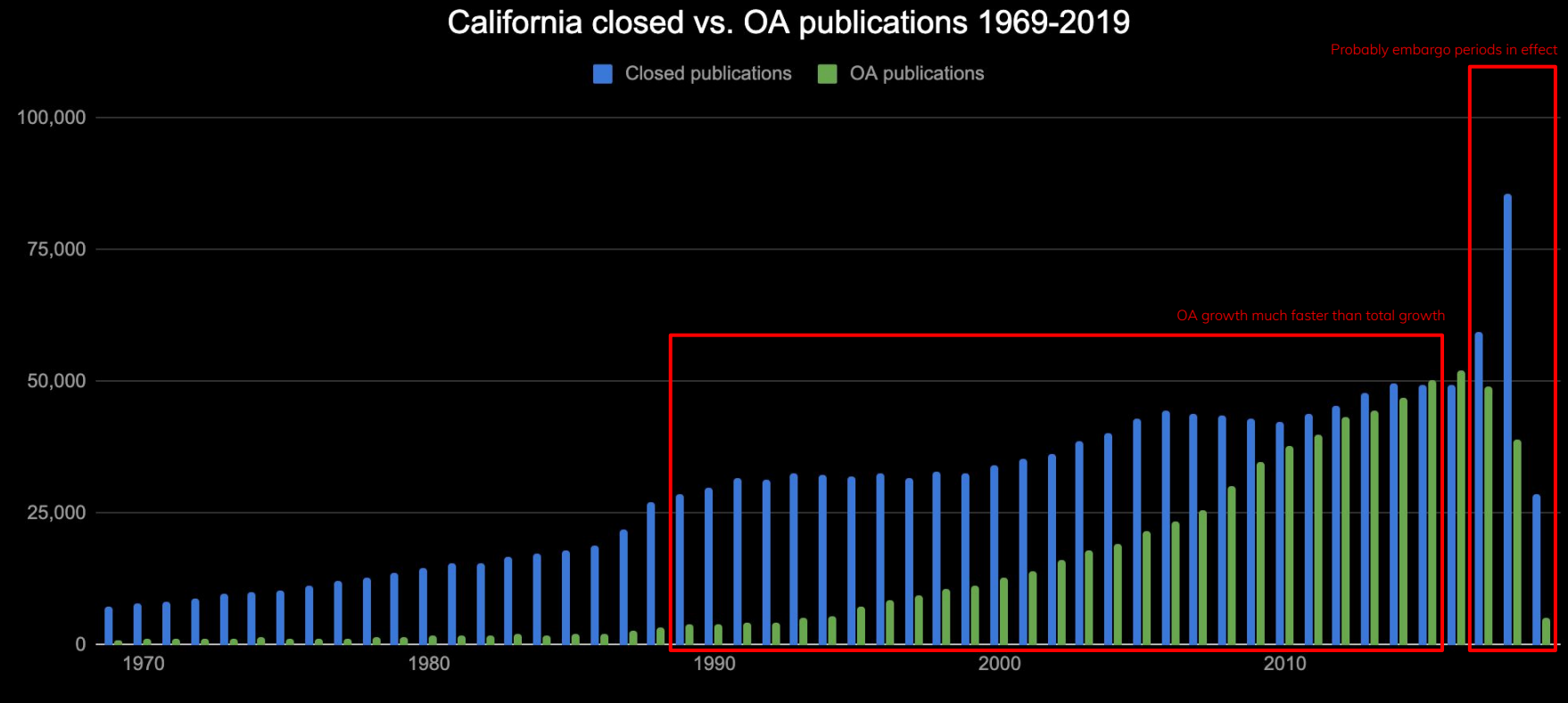
Which fields were more patented? And by whom?



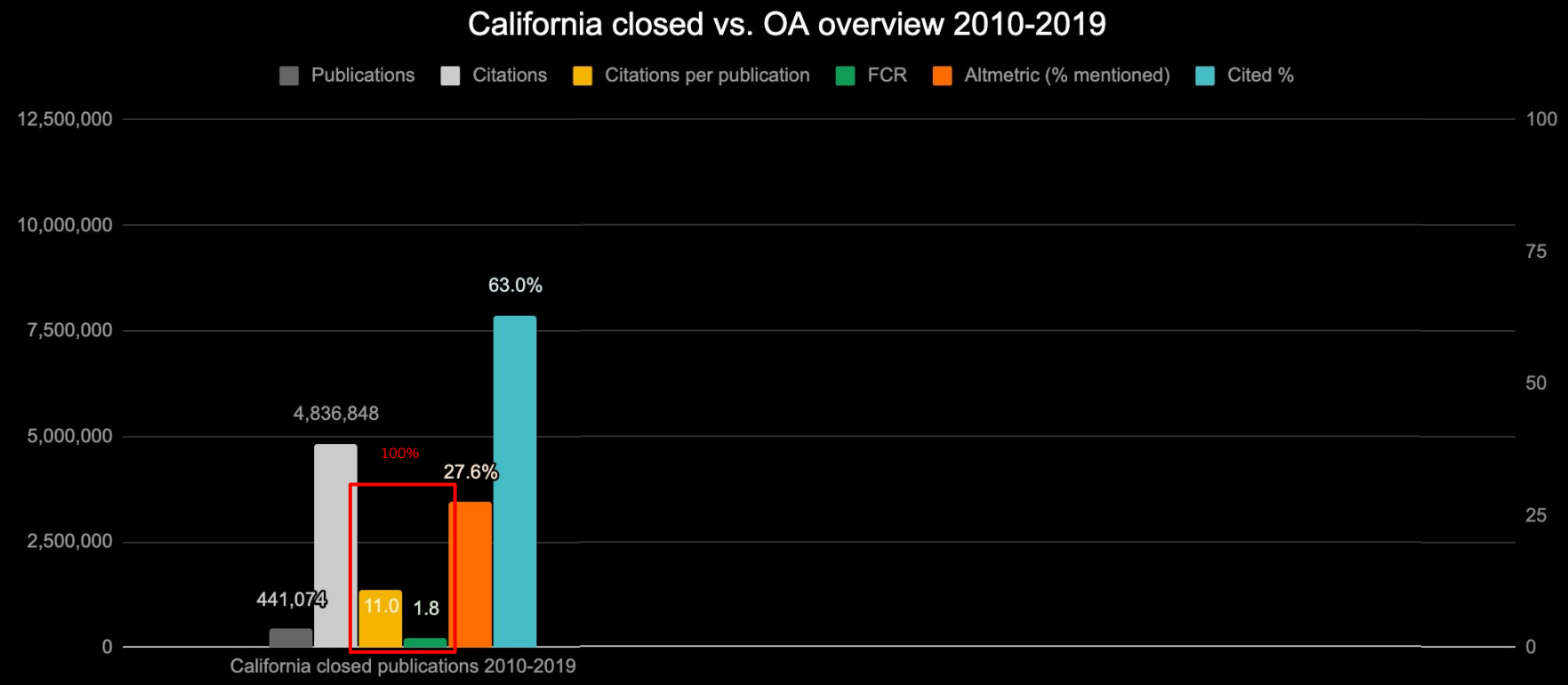
The point?

Comparing your strong fields with **corporate patent fields** can help your university find opportunities for corporate collaboration and tech transfer.

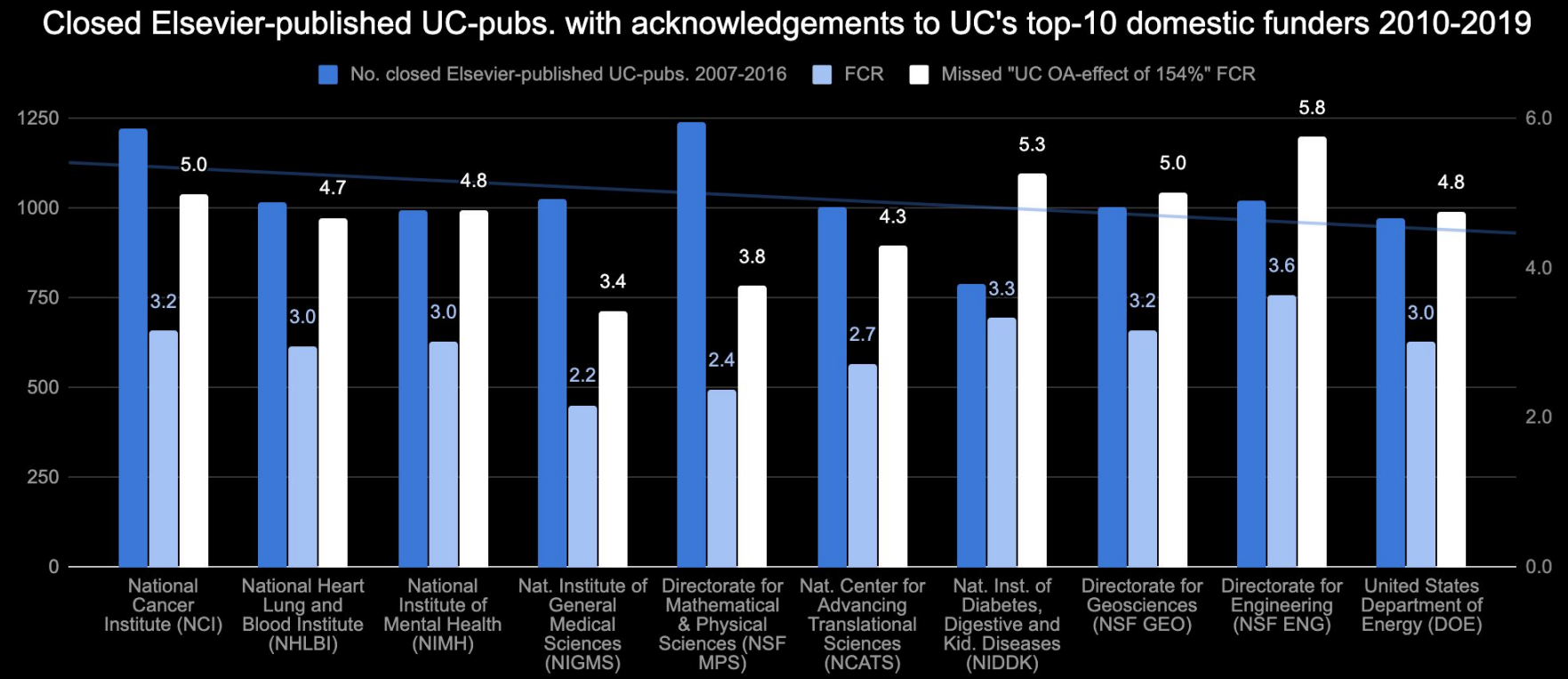
Closed vs. OA in California since 1969



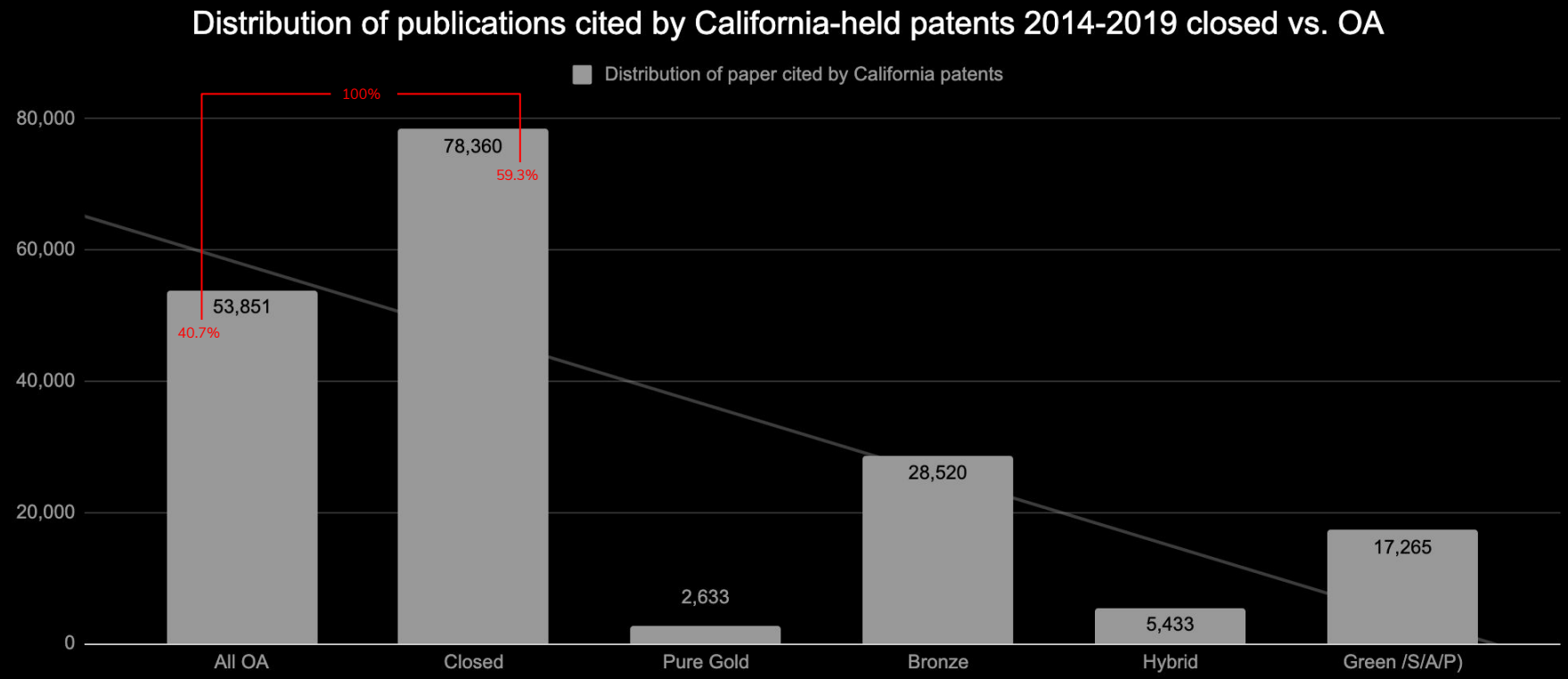
Let’s look at impact and attention



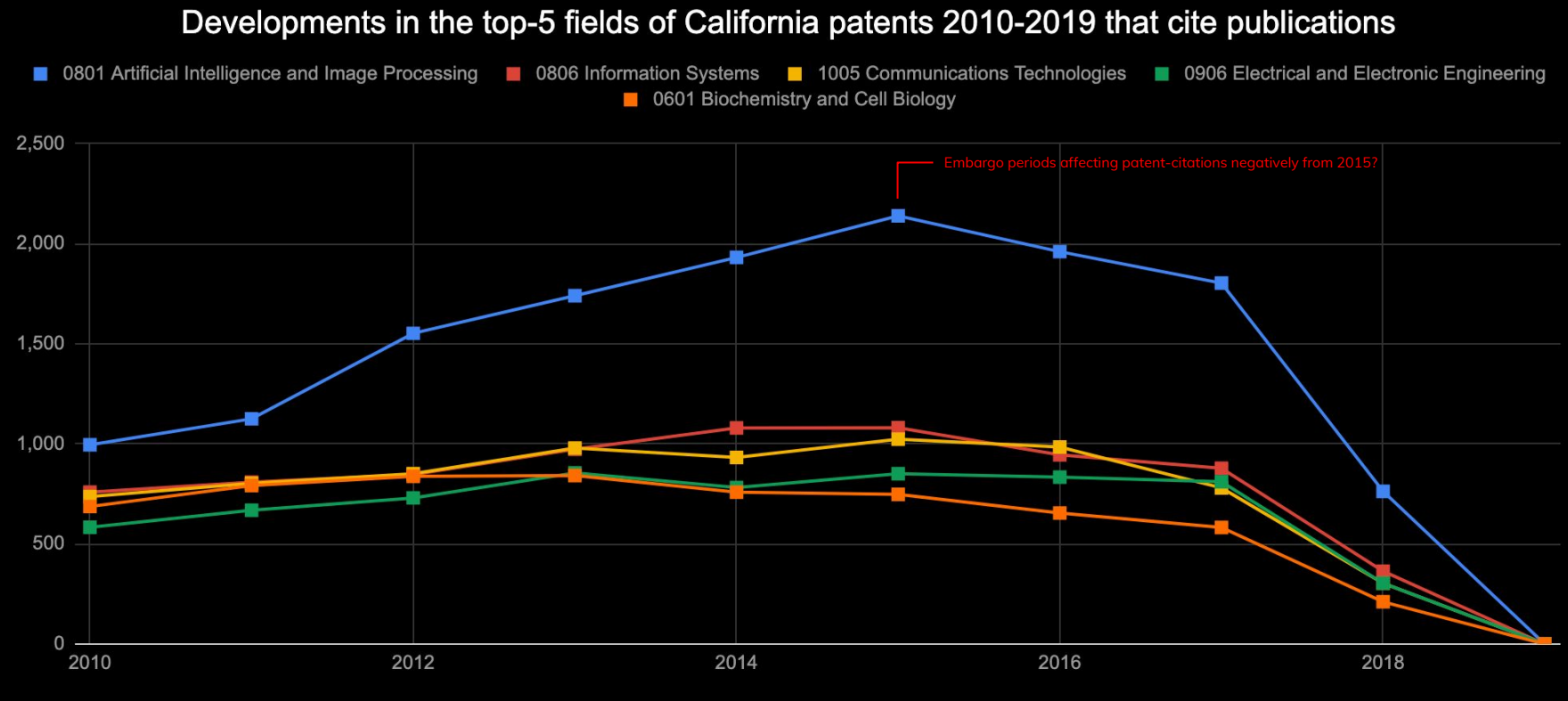
Lost funder-ROI (measured by impact)



Lost or delayed tech-transfer opportunities



Lost or delayed tech-transfer opportunities



The point?

Open Access matters. Rich context helps us better understand how.