

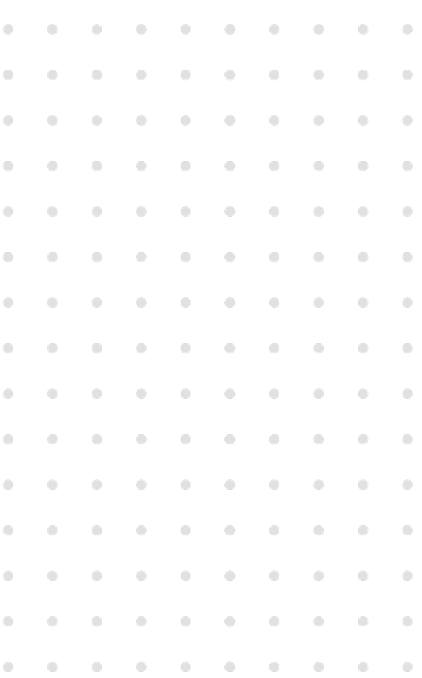


NSF Engineering Research
Visioning Alliance

**NORDP Presentation
November 2, 2023**

Conducting Research Intelligence for NSF's Engineering Research Visioning Alliance





OUR MISSION

To identify and develop bold and transformative new engineering research directions and to catalyze the engineering community's pursuit of innovative, high-impact research that benefits society.

Principal Investigators



Tony Boccanfuso
ERVA Co-Principal Investigator
UIDP



Strengthening
University-Industry
Partnerships



Charles Johnson-Bey
ERVA Co-Principal Investigator
Booz Allen Hamilton



Dorota A. Grejner-Brzezinska
ERVA Principal Investigator
The Ohio State University



Pramod Khargonekar
ERVA Co-Principal Investigator
University of California-Irvine



EdI Schamiloglu
ERVA Co-Principal Investigator
University of New Mexico



NSF Engineering Research
Visioning Alliance

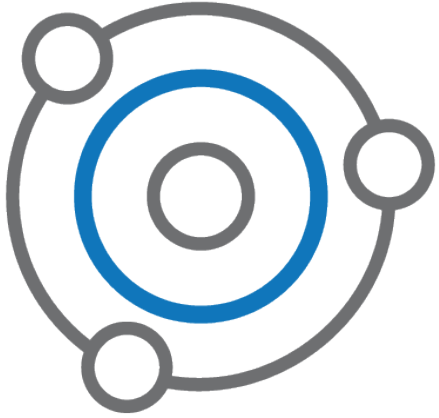


Visioning Events: ERVA's core activity





ERVA Outcomes



Identify lines of research ripe for engineering community pursuit with potential for the greatest benefits to society.

Actionable recommendations for academia, industry, nonprofits, and government.

Raise awareness of the role of engineering to advance the nation's pursuit of high-value, high-return research.

***With success:** Increase support for and understanding of engineering research.*



ERVA Activities & Aspirations



Obtain and integrate input from an inclusive and diverse body of engineering stakeholders into one coordinated voice.

Communicate nascent opportunities and priorities in engineering research to stakeholders to increase the pace and American leadership in technological innovation.

Strengthen connectivity across diverse stakeholders, increase cross-fertilization among engineering disciplinary communities, and enhance awareness that engineering contributes to our society.

Research Intelligence Working Group



Mark Schmidt
North Carolina State
University, Chair



Emily Devereux
University of South
Carolina,
Contractor



Carrier Berger
Purdue University
Online



Daniel Calto
Elsevier Inc



Jian Cao
Northwestern
University



Roman Caudillo
Intel Labs



Joonhyung Cho
University of Virginia



Marika Dunn
Rutgers
University



Mridul Gautam
University of
Nevada, Reno



Daniel Noneaker
Clemson
University



Connie Stovall
Virginia Tech

RIWG – Charter

- Provide landscape information to the Thematic Task Force with the assistance of the research intelligence contractor
 - Inform and define topics for visioning events
 - Ensure clear communication of data and information needs related to rapid response queries
- Help Thematic Task Force (TTF) with event scope to ensure underserved areas are addressed within each visioning event theme

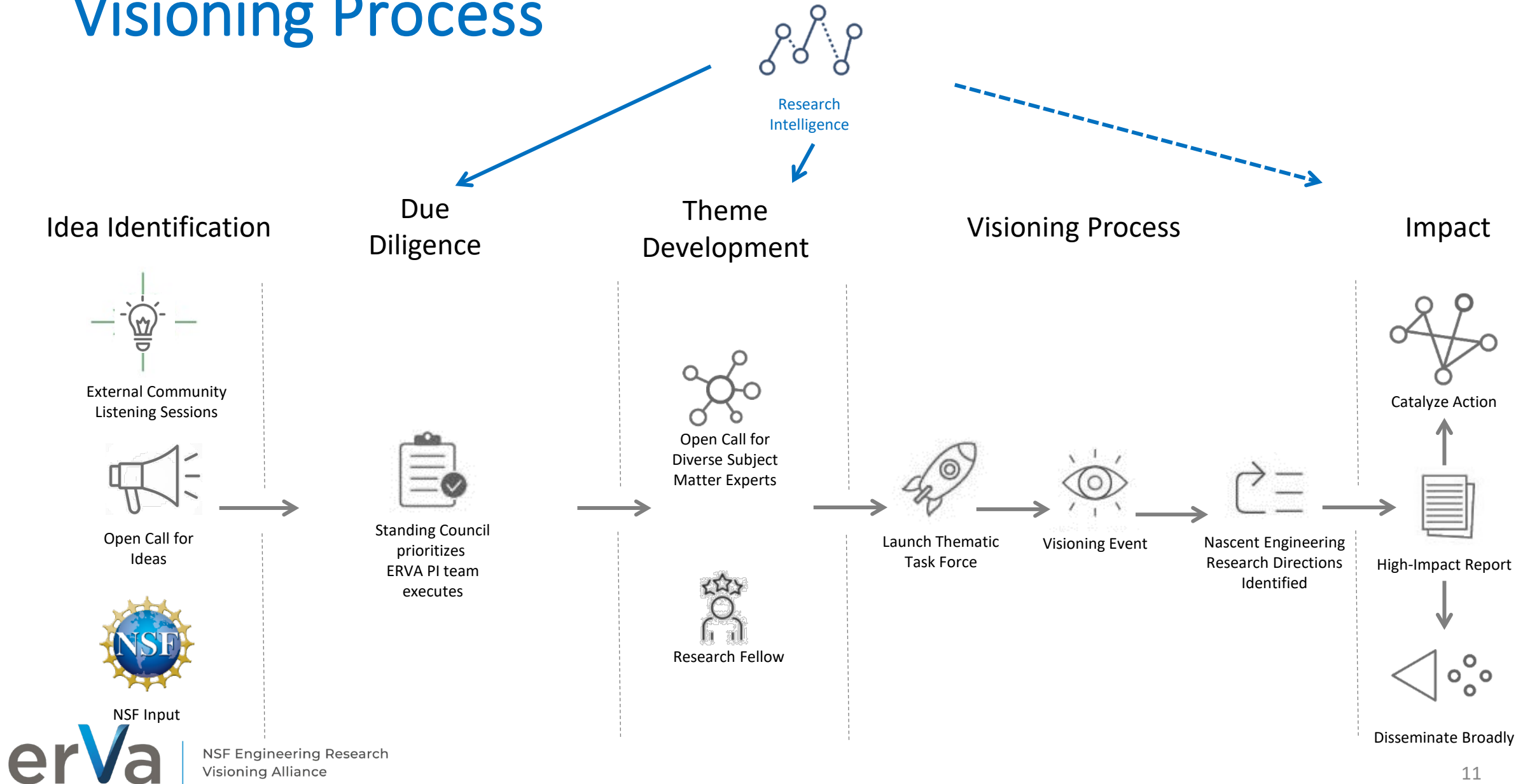
Our Premise

- A successful visioning event starts with a theme that has a clear role for engineering research that could have transformative societal impact if appropriately resourced

RIWG Evolutions in the Process

- RIWG formed in 2021 –third iteration of process (refinement)
- Considerations
 - Stage in process – feeding, checking or validating
 - Integrity of input (representations)

Visioning Process



Current Focus – Landscape Analysis

- Goal
 - Identify trends over the last five years
- Tenets
 - Guided by visioning event themes and subthemes to scan the landscape
- Objectives/uses
 - Identify whether the subtheme is resourced appropriately
 - Create talking points for opening comments
 - Foster discussion using a common language and scope among TTF
 - Show trends in keyword emergence – check TTF knowledge
 - Identify participants
 - Provide keywords for a bibliography of terms for participants

Current Focus – Landscape Analysis



Process

Identify – meet with taskforce chairs – identify initial keywords

Refine – present and refine individually with subtopic leads

Iterate – revise as needed throughout process

Summarize – final meeting with subtopic leads and TFF – takeaways



Landscape analysis – tools

Funding – federal

Publications – conference proceedings – news articles

Intellectual property – patents

Employment – workforce trends

Current Focus – Landscape Analysis

- Process
 - Identify – meet with taskforce chairs – identify initial keywords
 - Refine – present and refine individually with subtopic leads
 - Iterate – revise as needed throughout process
 - Summarize – final meeting with subtopic leads and TFF – takeaways
- Landscape analysis – tools
 - Funding – federal
 - Publications – conference proceedings – news articles
 - Intellectual property – patents
 - Employment – workforce trends

Funding – Landscape Analysis

Two Levels

- Thematic Summaries
- Vertical Summaries

Federal Funding Landscape – Data Sources

An official website of the United States government [Here's how you know](#) ▼

USASPENDING.gov Search Award Data Explore the Data ▼ Download the Data ▼ Find Resources ▼

Keyword Search Search Summary | Total Prime Award Amount: \$337.7M Prime Award Transaction Count: 338 Download

"Bioeconomy" 🔍

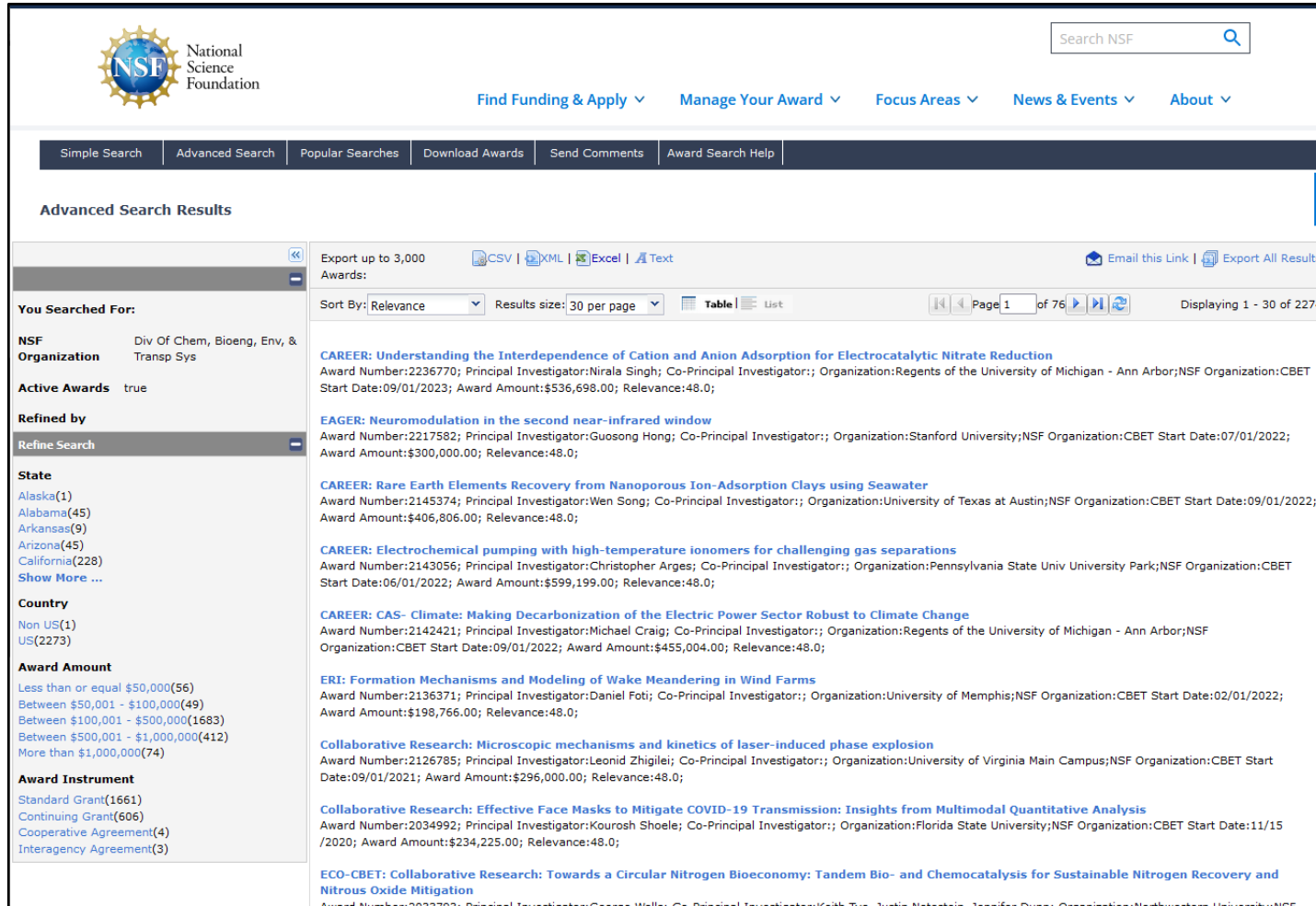
Use the Keyword Search to get a broad picture of award data on a given theme. To learn more about the fields the Keyword search matches to, read our [FAQ entry](#) on the topic. For a more targeted search, try our [Advanced Search tool](#), whose extensive filters let you find more precise data sets.

Spending By Transaction

Contracts 26 Contract IDVs 2 Grants 295 Direct Payments 0 Loans 1 ⓘ Other 14

Award ID	Mod	Recipient Name	Action Date	Transaction Amount	Awarding Agency
75A50223F62001	0	BLACK MESA TECHNOLOGY INC.	9/29/2023	\$3,783,171	Department of Health and Human S...
75A50223F80012	0	THE MITRE CORPORATION	7/24/2023	\$2,572,287	Department of Health and Human S...
49100423P0058	0	KNOWINNOVATION INC	8/16/2023	\$249,828	National Science Foundation
DEDT0012899	0	AETHERQUEST SOLUTIONS, INC.	3/7/2017	\$155,286	Department of Energy
DEBP0004123	0	TCG CONSULTING INC	4/30/2015	\$76,385	Department of Energy
DEBP0004122	1	TCG CONSULTING INC	5/27/2015	\$35,336	Department of Energy
DEDT0012612	1	AETHERQUEST SOLUTIONS, INC.	2/9/2017	\$31,762	Department of Energy
12C0BA20P0015	0	ADVANCED BIOFUELS USA, INC.	3/11/2020	\$16,000	Department of Agriculture
DEEE0007097	0	ASCENSION PUBLISHING, INC.	6/3/2015	\$10,000	Department of Energy
1231ME18P0065	0	ASCENSION PUBLISHING, INC.	9/24/2018	\$10,000	Department of Agriculture
DEDT0012752	0	AETHERQUEST SOLUTIONS, INC.	2/6/2017	\$9,262	Department of Energy

Federal Funding Landscape – Data Sources



NSF National Science Foundation

Find Funding & Apply ▾ Manage Your Award ▾ Focus Areas ▾ News & Events ▾ About ▾

Simple Search Advanced Search Popular Searches Download Awards Send Comments Award Search Help

Advanced Search Results

Export up to 3,000 Awards: CSV | XML | Excel | Text Email this Link | Export All Results

You Searched For:
NSF Organization Div Of Chem, Bioeng, Env, & Transp Sys
Active Awards true

Refined by
Refine Search

State
 Alaska(1)
 Alabama(45)
 Arkansas(9)
 Arizona(45)
 California(228)
 Show More ...

Country
 Non US(1)
 US(2273)

Award Amount
 Less than or equal \$50,000(56)
 Between \$50,001 - \$100,000(49)
 Between \$100,001 - \$500,000(1683)
 Between \$500,001 - \$1,000,000(412)
 More than \$1,000,000(74)

Award Instrument
 Standard Grant(1661)
 Continuing Grant(606)
 Cooperative Agreement(4)
 Interagency Agreement(3)

Sort By: Relevance Results size: 30 per page Table List Page 1 of 76 Displaying 1 - 30 of 2274

CAREER: Understanding the Interdependence of Cation and Anion Adsorption for Electrocatalytic Nitrate Reduction
 Award Number:2236770; Principal Investigator:Nirala Singh; Co-Principal Investigator;; Organization:Regents of the University of Michigan - Ann Arbor;NSF Organization:CBET Start Date:09/01/2023; Award Amount:\$536,698.00; Relevance:48.0;

EAGER: Neuromodulation in the second near-infrared window
 Award Number:2217582; Principal Investigator:Guosong Hong; Co-Principal Investigator;; Organization:Stanford University;NSF Organization:CBET Start Date:07/01/2022; Award Amount:\$300,000.00; Relevance:48.0;

CAREER: Rare Earth Elements Recovery from Nanoporous Ion-Adsorption Clays using Seawater
 Award Number:2145374; Principal Investigator:Wen Song; Co-Principal Investigator;; Organization:University of Texas at Austin;NSF Organization:CBET Start Date:09/01/2022; Award Amount:\$406,806.00; Relevance:48.0;

CAREER: Electrochemical pumping with high-temperature ionomers for challenging gas separations
 Award Number:2143056; Principal Investigator:Christopher Arges; Co-Principal Investigator;; Organization:Pennsylvania State Univ University Park;NSF Organization:CBET Start Date:06/01/2022; Award Amount:\$599,199.00; Relevance:48.0;

CAREER: CAS- Climate: Making Decarbonization of the Electric Power Sector Robust to Climate Change
 Award Number:2142421; Principal Investigator:Michael Craig; Co-Principal Investigator;; Organization:Regents of the University of Michigan - Ann Arbor;NSF Organization:CBET Start Date:09/01/2022; Award Amount:\$455,004.00; Relevance:48.0;

ERI: Formation Mechanisms and Modeling of Wake Meandering in Wind Farms
 Award Number:2136371; Principal Investigator:Daniel Foti; Co-Principal Investigator;; Organization:University of Memphis;NSF Organization:CBET Start Date:02/01/2022; Award Amount:\$198,766.00; Relevance:48.0;

Collaborative Research: Microscopic mechanisms and kinetics of laser-induced phase explosion
 Award Number:2126785; Principal Investigator:Leonid Zhigilei; Co-Principal Investigator;; Organization:University of Virginia Main Campus;NSF Organization:CBET Start Date:09/01/2021; Award Amount:\$296,000.00; Relevance:48.0;

Collaborative Research: Effective Face Masks to Mitigate COVID-19 Transmission: Insights from Multimodal Quantitative Analysis
 Award Number:2034992; Principal Investigator:Kourosh Shoele; Co-Principal Investigator;; Organization:Florida State University;NSF Organization:CBET Start Date:11/15/2020; Award Amount:\$234,225.00; Relevance:48.0;

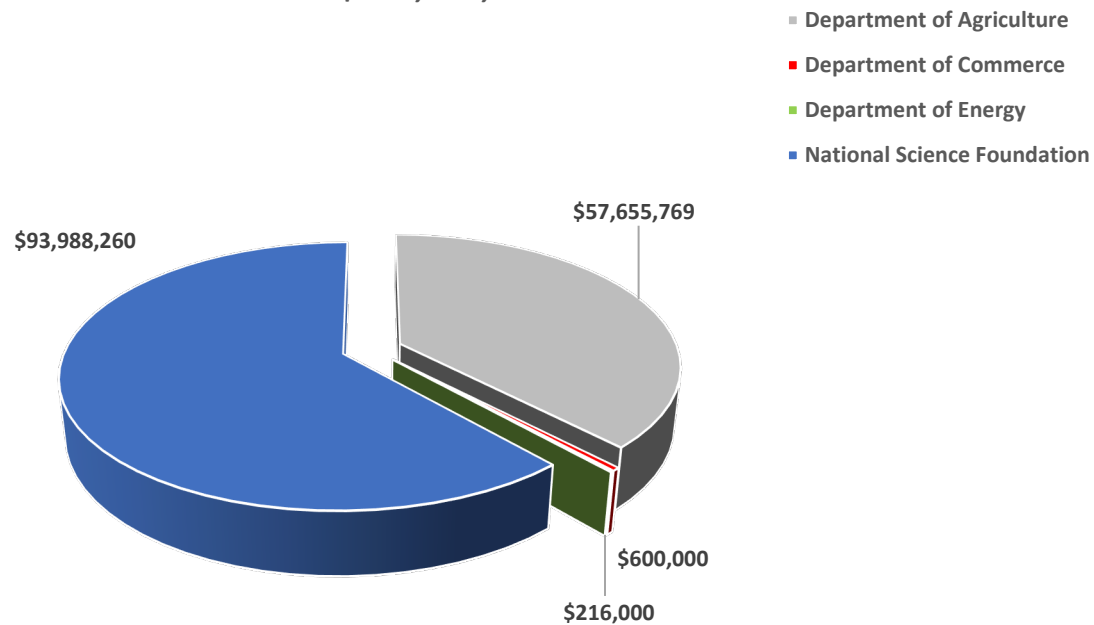
ECO-CBET: Collaborative Research: Towards a Circular Nitrogen Bioeconomy: Tandem Bio- and Chemocatalysis for Sustainable Nitrogen Recovery and Nitrous Oxide Mitigation
 Award Number:2022702; Principal Investigator:George Waller; Co-Principal Investigator:Keith Tye, Justin Metcalfe, Jennifer Dunn; Organization:Northwestern University;NSF Organization:CBET Start Date:09/01/2022; Award Amount:\$1,000,000.00; Relevance:48.0;

Federal Funding Landscape

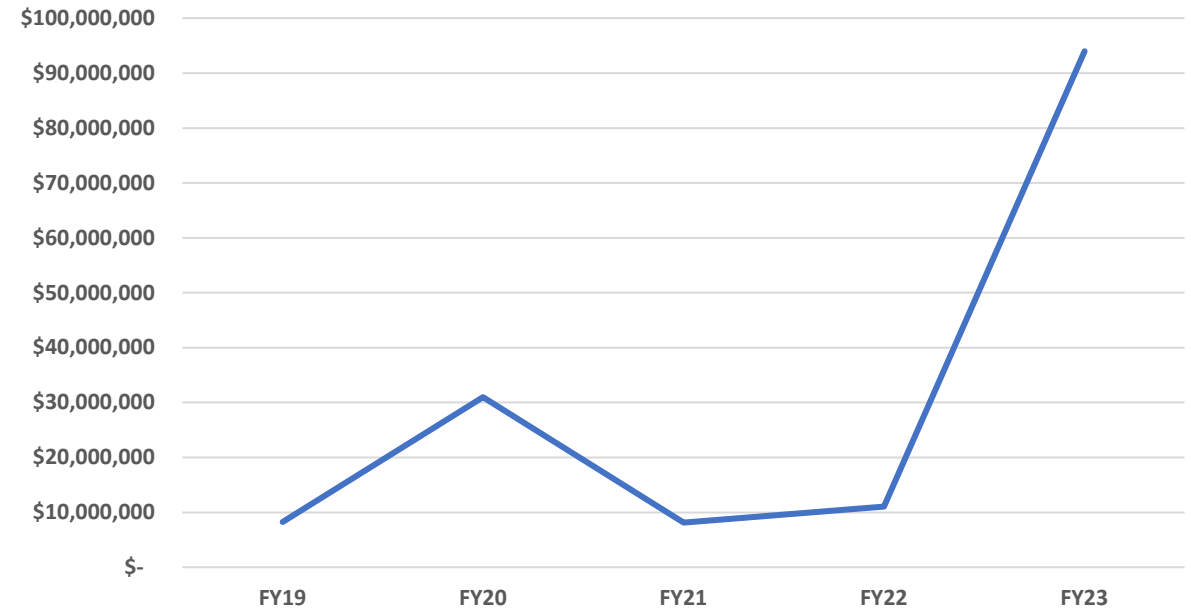
total_obligated_amount	Start Date	End Date	Awarding Agency	Awarding Sub Agency	Awarding Office	object_classes_funding_this_award	Program Activity	Recipient	Country	CFDA #	CFDA Title	Prime Award Description
\$ 489,911	2/15/2018	2/14/2022	Department of Agriculture	National Institute of Food and Agriculture	INSTITUTE OF BIOENERGY, CLIMATE, AND ENVIRONMENT (IBCE)	41.0: Grants, subsidies, and contributions	0005: AGRICULTURE FOOD AND RESEARCH INITIATIVE	AUBURN UNIVERSITY	USA	10.31	AGRICULTURE AND FOOD RESEARCH INITIATIVE (AFRI)	PRIME AWARD DESCRIPTION: FATTY ACID ESTERS, MANY OF WHICH DERIVE FROM FATTY ACIDS AND GLYCEROL, ARE VALUABLE CHEMICALS WITH EXTENSIVE APPLICATIONS IN FOOD, BEVERAGE, COSMETICS, AND PHARMACEUTICAL INDUSTRIES. SHORT-CHAIN ESTERS CAN ALSO BE USED FOR SOLVENTS, COATINGS, PAINTS, AND FUEL COMPONENTS. IT IS PROJECTED THAT THE US MARKET DEMAND FOR FATTY ACID ESTERS WILL REACH \$4.34 BILLION BY 2022. WHILE THE TRADITIONAL APPROACHES FOR ESTER PRODUCTION THROUGH PETROLEUM CHEMICAL ROUTES ARE HIGHLY ENERGY-CONSUMING AND GENERATE A LARGE AMOUNT OF ENVIRONMENTAL POLLUTANTS, MORE AND MORE INTERESTS HAVE BEEN EVOKED RECENTLY FOR ESTER PRODUCTION THROUGH BIOLOGICAL ROUTES. THERE ARE GENERALLY TWO MICROBIAL PATHWAYS FOR ESTER PRODUCTION, EITHER BY ALCOHOL ACYL TRANSFERASES (AATS) WITH ACYL-COA AND ALCOHOLS AS FEEDING COMPOUNDS, OR BY LIPASE WITH FATTY ACID AND ALCOHOL AS REACTING MATERIALS. NON-PATHOGENIC CLOSTRIDIUM HAS TREMENDOUS SIGNIFICANCE FOR INDUSTRIAL BIOCHEMICAL PRODUCTION. WITH THE ANAEROBIC FERMENTATION PATHWAY, IT CAN GENERATE ACYL-COAS (ACETYL-COA AND BUTYL-COA), ACIDS (ACETIC ACID AND BUTYRIC ACID), AND ALCOHOLS (ETHANOL AND BUTANOL). THEREFORE, IN THIS PROJECT, WE PROPOSE TO USE CLOSTRIDIUM AS A PLATFORM TO BE METABOLICALLY ENGINEERED FOR ESTER PRODUCTION, PARTICULARLY FOR BUTYL BUTYRATE (BB) PRODUCTION. FIRST, BASED ON THE CRISPR-CAS SYSTEM THAT WE RECENTLY DEVELOPED FOR GENOME ENGINEERING, WE WILL ENGINEER THE CLOSTRIDIUM STRAIN FOR ENHANCED BUTYRYL-COA/BUTYRATE AND BUTANOL CO-PRODUCTION, PROVIDING FEEDING COMPOUNDS FOR BB PRODUCTION. FURTHER, WE WILL ENGINEER THE MODIFIED STRAIN FOR BB PRODUCTION, BY INTRODUCING LIPASE GENES (PRODUCING BB FROM BUTYRIC ACID AND BUTANOL) AND AAT GENES (PRODUCING BB FROM BUTYRYL-COA AND BUTANOL). MEANWHILE, WE WILL DEVELOP A GENOME-SCALE METABOLIC MODEL, TO GUIDE OUR FURTHER METABOLIC OPTIMIZATION FOR ENHANCED BB PRODUCTION. ULTIMATELY, WE WILL ESTABLISH A BIOPROCESS BASED ON THE METABOLICALLY STABLE CLOSTRIDIUM STRAINS FOR RENEWABLE ESTER PRODUCTION FROM LOW-VALUE CARBON SOURCES. THIS PROJECT AIMS TO TACKLE A KEY ISSUE RELATED TO BIOFUEL/BIOCHEMICAL PRODUCTION BY PRODUCING A HIGH VALUE BIOPRODUCT THAT IS EASILY RECOVERABLE, THUS DECREASING ENDPRODUCTS TOXICITY AND IMPROVING FEEDSTOCK CONVERSION EFFICIENCY AND PRODUCT PRODUCTION RATE. THIS RESEARCH ALIGNS WELL WITH THE PRIORITY AREA OF "BIOPROCESSING AND BIOENGINEERING". VALUE-ADDED BB WILL BE PRODUCED FROM LOW-VALUE MATERIALS THROUGH OPTIMIZED BIOPROCESS USING ENGINEERED MICROORGANISM. THIS REPRESENTS A POTENTIALLY TRANSFORMATIVE RESEARCH WHICH CAN LEAD TO AN ENABLING BIOPROCESS IN SUPPORT OF THE US BIOECONOMY. IT ALIGNS WELL WITH THE US ENDEAVORS TO FOSTER THE
1000000	4/1/2018	3/31/2022	Department of Agriculture	National Institute of Food and Agriculture	INSTITUTE OF BIOENERGY, CLIMATE, AND ENVIRONMENT (IBCE)	41.0: Grants, subsidies, and contributions	0005: AGRICULTURE FOOD AND RESEARCH INITIATIVE	REGENTS OF THE UNIVERSITY OF MINNESOTA	USA	10.31	AGRICULTURE AND FOOD RESEARCH INITIATIVE (AFRI)	WITH SIGNIFICANT POTENTIAL FOR IMPROVING RURAL ECONOMIES OF THE MIDWESTERN UNITED STATES. POPLARS ARE AMONG THE MOST TESTED AND PROMISING WOODY ENERGY CROP FOR THE MIDWEST. THE POTENTIAL FOR ACHIEVING ONE BILLION DRY TONS OF CELLULOSIC BIOMASS PER YEAR NATIONALLY BY 2030 AS DOCUMENTED IN THE DOE 2016 BILLION TON REPORT WILL REQUIRE THE PRODUCTION OF MORE THAN 239 MILLION DRY TONS FROM ENERGY CROPS GROWN ON AGRICULTURAL SOILS. POPLAR CULTURE HAS SIGNIFICANT CAPACITY TO HELP MEET THIS TARGET, AND THE MIDWEST HAS THE ATTRIBUTES TO BE A MAJOR PART OF THE ACREAGE REQUIRED DUE TO ADEQUATE RAINFALL AND A LARGE CROP AND PASTURELAND RESOURCE. THE CURRENT CELLULOSIC ENERGY CROP OUTPUT IN THE UNITED STATES IS VIRTUALLY ZERO, INDICATING THAT AN INTENSIVE RESEARCH, DEVELOPMENT, AND OUTREACH EFFORT WILL BE NEEDED TO MEET THE NATIONAL BIOMASS FEEDSTOCK GOAL WITHIN THE NEXT 13 YEARS. ESTABLISHMENT OF SUCCESSFUL POPLAR PLANTATIONS REQUIRES GENETIC IMPROVEMENTS FOR INCREASED AND CONSISTENT YIELD, DISEASE RESISTANCE, AND BROADENED ADAPTABILITY ACROSS A RANGE OF CLIMATE AND SOIL TYPES. THESE GENETIC PARAMETERS ARE THE BIOLOGICAL LIMITATIONS TO THE EXPANSION OF HYBRID POPLARS ACROSS THE MIDWEST THAT ARE GERMANE TO THE SUSTAINABLE BIOENERGY AND BIOPRODUCTS CHALLENGE AREA RFA. THERE HAVE BEEN SUCCESSFUL LARGE-SCALE COMMERCIAL POPLAR PLANTATIONS IN MINNESOTA, THE PACIFIC NORTHWEST, AND THE MID-SOUTH. IN ALL CASES SUCCESS WAS DUE TO RESEARCH THAT DEVELOPED LOCALLY ADAPTED AND TESTED POPULUS GENOTYPES. THE ECONOMIC VIABILITY OF HYBRID POPLAR IS LIMITED, HOWEVER, BY THE CURRENT SCALE OF BREEDING, SELECTION, AND TESTING, AND VARIES WITH SHIFTS IN COMMODITY AND PETROLEUM PRICES, REGIONAL BIOMASS SOURCES, AND NATIONAL ENERGY POLICIES. GENETIC ADVANCES NEED TO BE COUPLED WITH AN ASSESSMENT OF TRADE-OFFS BETWEEN POPLARS VERSUS COMMODITY CROPS THAT WILL INDICATE IF AND WHEN GROWERS SHOULD MAKE THE DECISION TO PLANT POPLARS. OTHER LIMITATIONS INCLUDE THE SOCIAL ACCEPTANCE OF A MULTI-YEAR CROP BY FARMERS. ALL OF THESE FACTORS HAVE PREVENTED THE WIDESPREAD PLANTING OF HYBRID POPLARS ACROSS THE MIDWEST. DEPENDABLE YIELD IMPROVEMENT WILL DECREASE INVESTMENT RISK AND PRODUCTION COSTS FOR GROWERS AND INDUSTRIAL WOOD USERS BY REDUCING THE AMOUNT OF LAND AND MINIMIZING THE ROTATION LENGTH (YEARS OF GROWING TIME) REQUIRED PER UNIT OF BIOMASS. ADOPTION OF POPLARS AS AN AGRICULTURAL CROP ALSO DEPENDS ON AN EFFECTIVE OUTREACH PROGRAM TO FARMERS, INDUSTRIAL GROWERS, AND FEEDSTOCK PROCESSORS THAT ARE CLOSELY INTEGRATED WITH NEW RESEARCH RESULTS. BIO-REFINERIES AND OTHER PROCESSORS NEED GOOD ESTIMATES OF DEDICATED PLANTATION ACREAGES REQUIRED TO SUPPLY THEIR PLANTS, WHICH IN TURN DEPEND ON PROVEN YIELD VALUES FOR GENETICALLY IMPROVED POPLAR GENOTYPES. NEW BIOECONOMY INDUSTRIES WILL HAVE A PARTICULAR NEED FOR A GUARANTEED BIOMASS SUPPLY IN THE FACE OF COMPETITION FOR WOOD FROM NATURAL FORESTS BY ESTABLISHED FOREST PRODUCTS COMPANIES. FURTHERMORE, POPLAR CULTURE CAN SUPPLY A HIGHER QUALITY BIOMASS (I.E., WOOD) THAN AGRICULTURAL RESIDUES IN NON-FORESTED REGIONS. THE IMMEDIATE GOAL OF THE PROPOSED PROJECT IS TO MAKE MAJOR ADVANCES IN THE YIELD AND FUTURE COMMERCIALIZATION OF POPLAR PLANTATIONS IN THE MIDWESTERN UNITED STATES THROUGH GENETIC DEVELOPMENT, ECONOMIC ANALYSIS, AND ASSOCIATED EXTENSION INNOVATION PROGRAMMING THAT WILL MINIMIZE THE TIME TO ADOPTION OF COMMERCIAL POPLAR CULTURE. THIS WILL BE ACHIEVED BY DEVELOPING UNIQUE AND VALUABLE GENETIC RESOURCES TO SUPPORT CONTINUING AND FUTURE BREEDING EFFORTS, EVALUATING THE ECONOMICS OF POPLARS VERSUS MAJOR AGRICULTURAL CROPS, AND IMPLEMENTING AN EXTENSION PROGRAM CLOSELY

Federal Funding Landscape (Verticals)

Bioeconomy Funding by Agency
FY19-FY23 Total Obligations
Total: \$152,460,029



Bioeconomy Funding by Year
FY19-FY23 Total Obligations



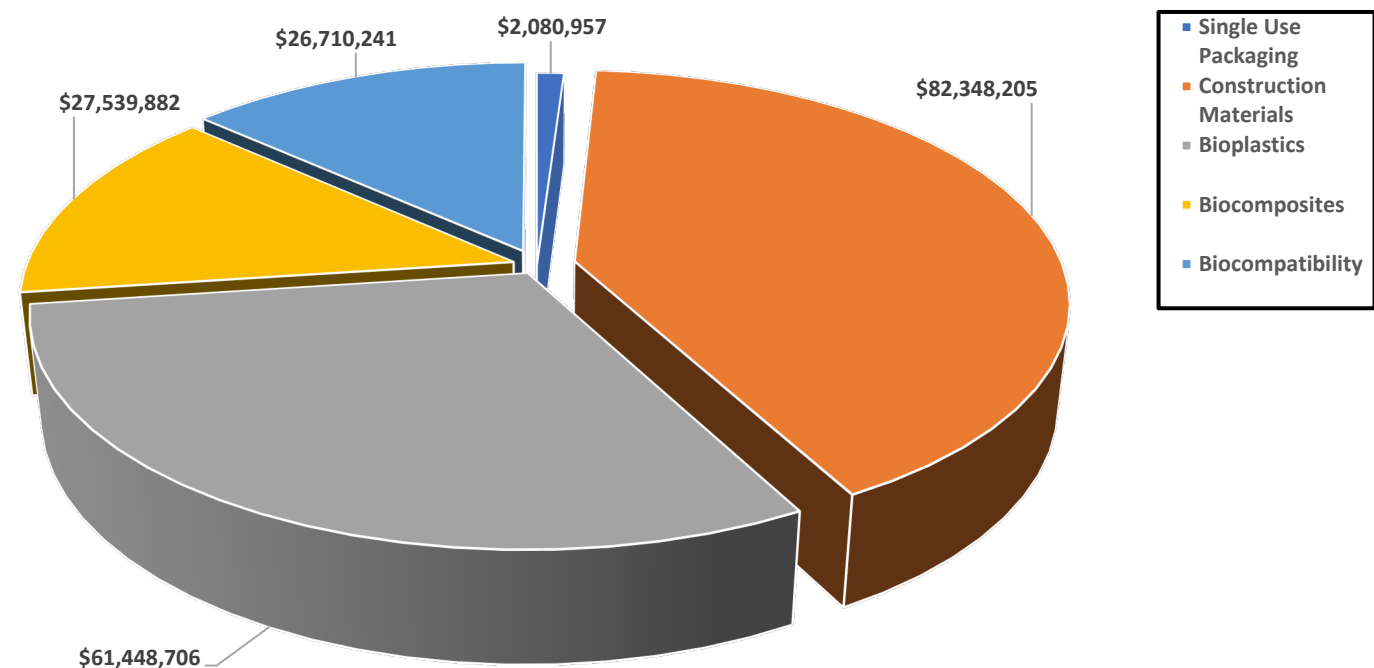
Vertical Example:

Sustainable Materials: Chemical: Bioeconomy

Keywords: Abiotic Biotic Interface, Biomaterials, Biomanufacturing, Bioeconomy, Carbon Intensity

Federal Funding Landscape (Thematic Summaries)

Funding Landscape: Sustainable Materials Themes Revision Summary
FY18-23 Federal Funding



Thematic Summary	
Theme	Total Funding
Single Use Packaging	\$ 2,080,957
Construction Materials	\$ 82,348,205
Bioplastics	\$ 61,448,706
Biocomposites	\$ 27,539,882
Biocompatibility	\$ 26,710,241

**Pie Chart excludes DHHS (NIH) in biocomposites.

Publications Landscape Analysis

- Develop keyword search string and apply parameters: time frame, publication type
- Search and save in Scopus for conference proceedings and articles
- Export findings into Bibliometrix and view in Biblioshiny
- Modify findings by combining terms and remove select terms from visualizations
- Topic trends best for this scenario

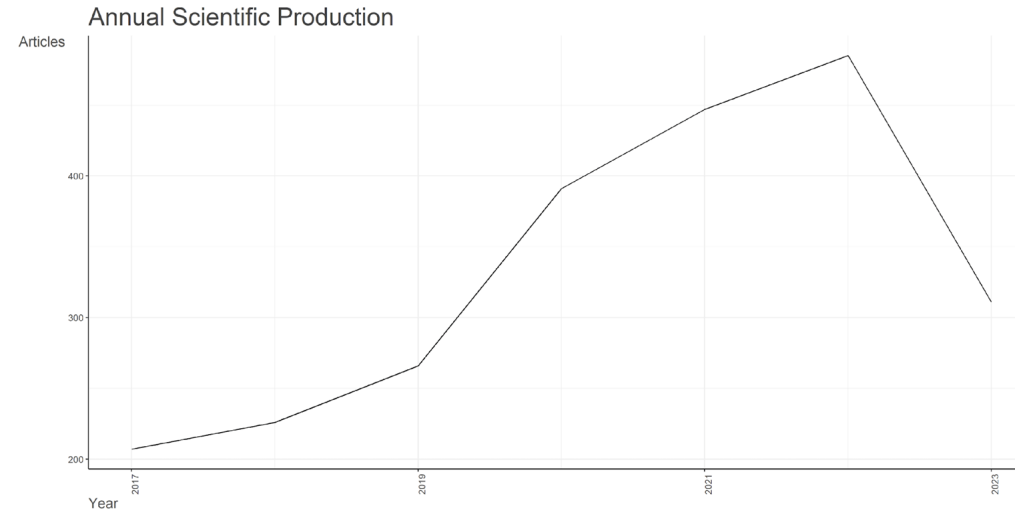


Scopus



Overview— Alternative Microbials Landscape Analysis

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2017:2023
Sources (Journals, Books, etc)	786
Documents	2333
Annual Growth Rate %	7.02
Document Average Age	2.57
Average citations per doc	19.28
References	152746
DOCUMENT CONTENTS	
Keywords Plus (ID)	15515
Author's Keywords (DE)	5291
AUTHORS	
Authors	10243
Authors of single-authored docs	46
AUTHORS COLLABORATION	
Single-authored docs	47
Co-Authors per Doc	6.09
International co-authorships %	26.45
DOCUMENT TYPES	
article	1633
conference paper	27
review	673

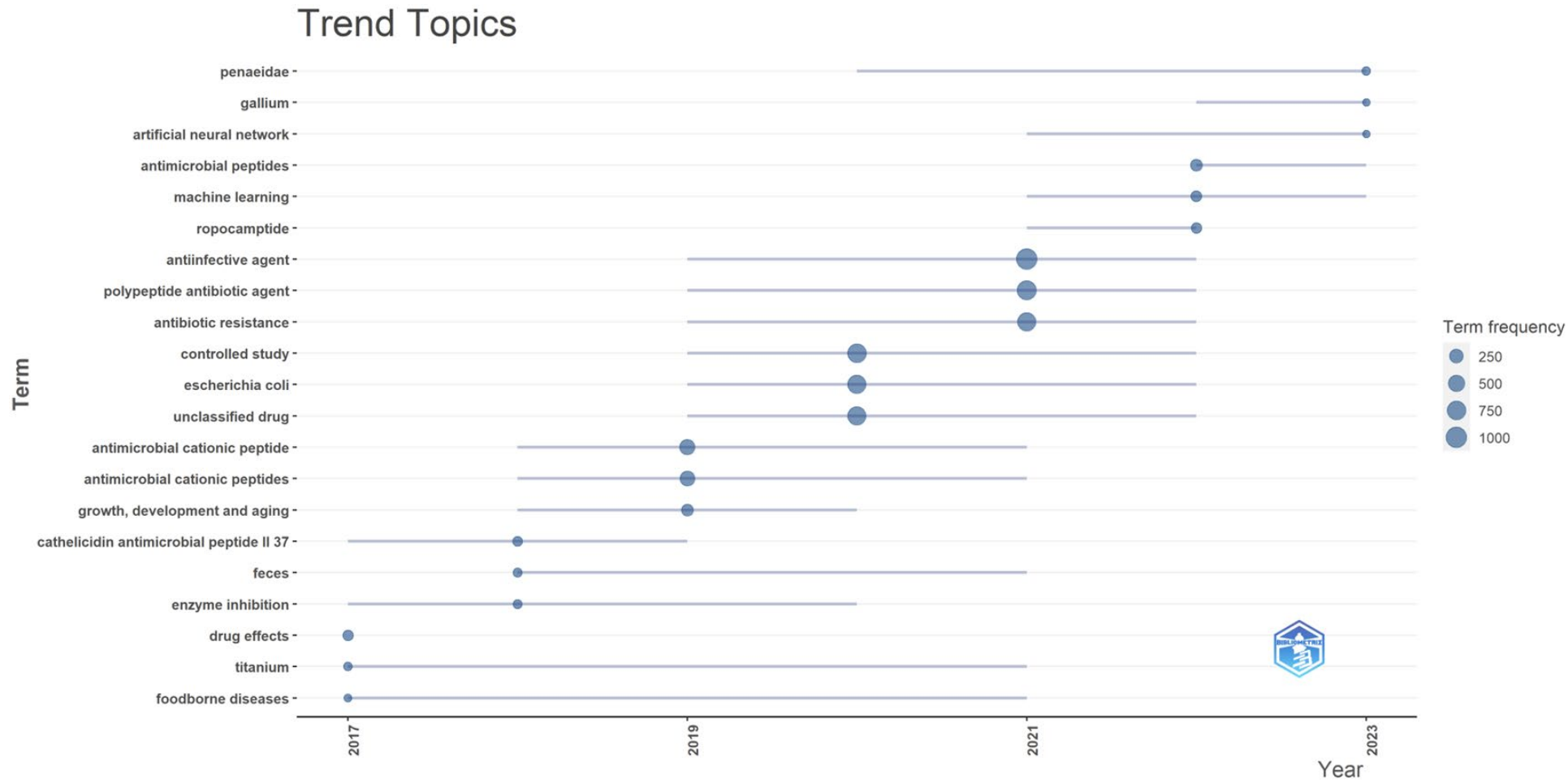


Search string in Scopus: (alternative AND antimicrobial*)
AND

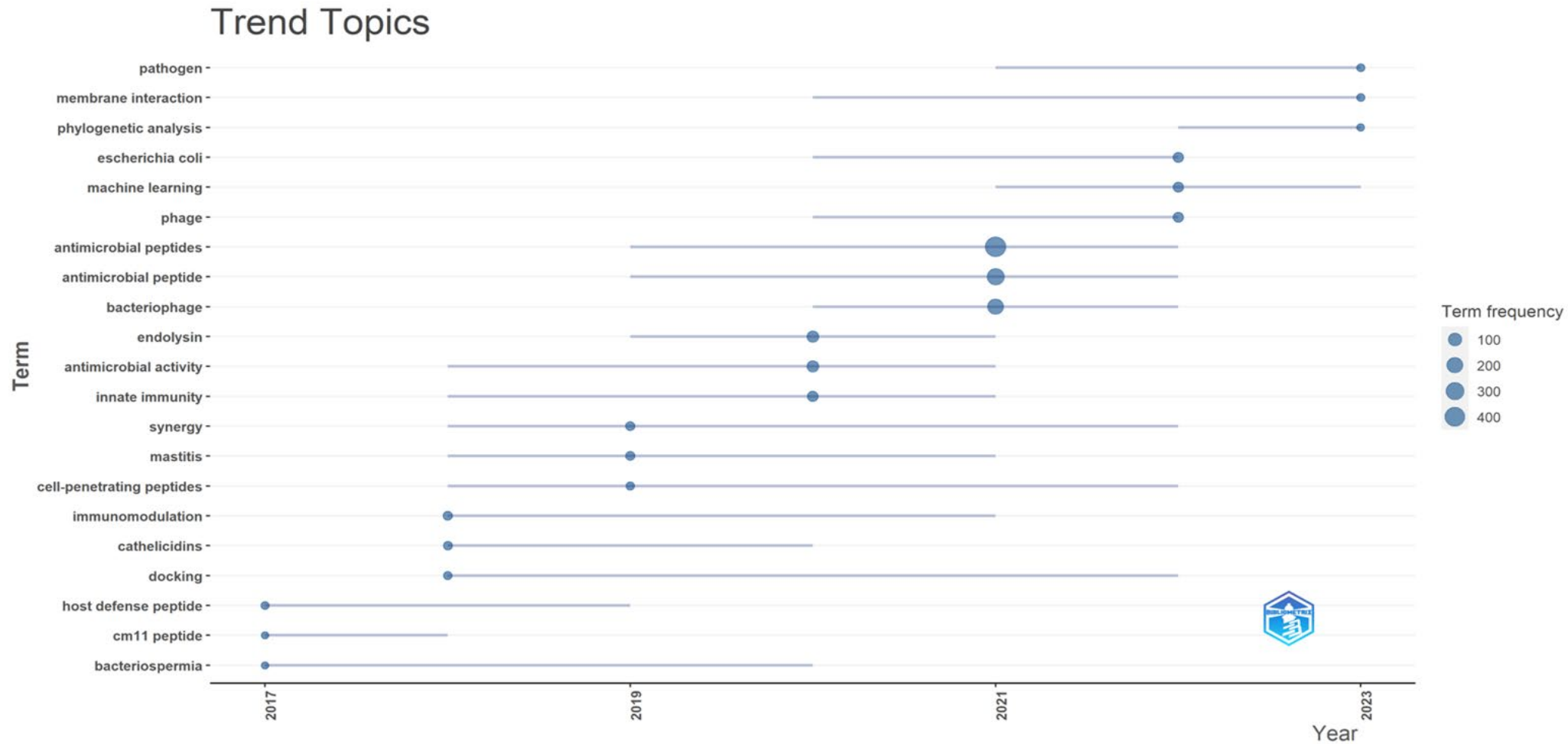
("alternative biotics" OR "machine learning" OR "artificial intelligence"
OR bacteriophage OR "repurposed drugs" OR "antimicrobial peptide*" OR "antimicrobial polymer*" OR "drug target*")

Editorials, books, book chapters, datasets excluded

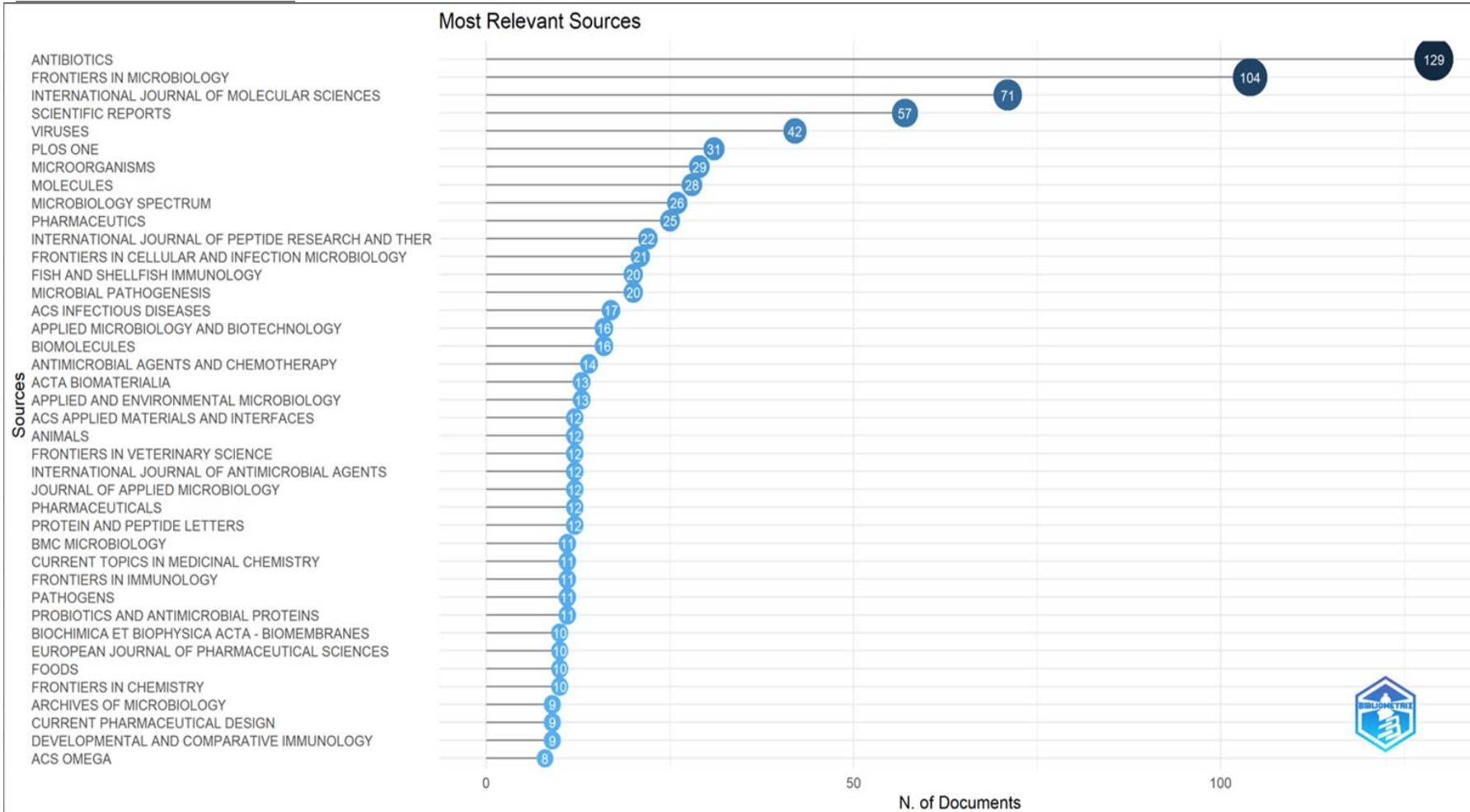
Topic Trends Over Time Based on Keywords Plus



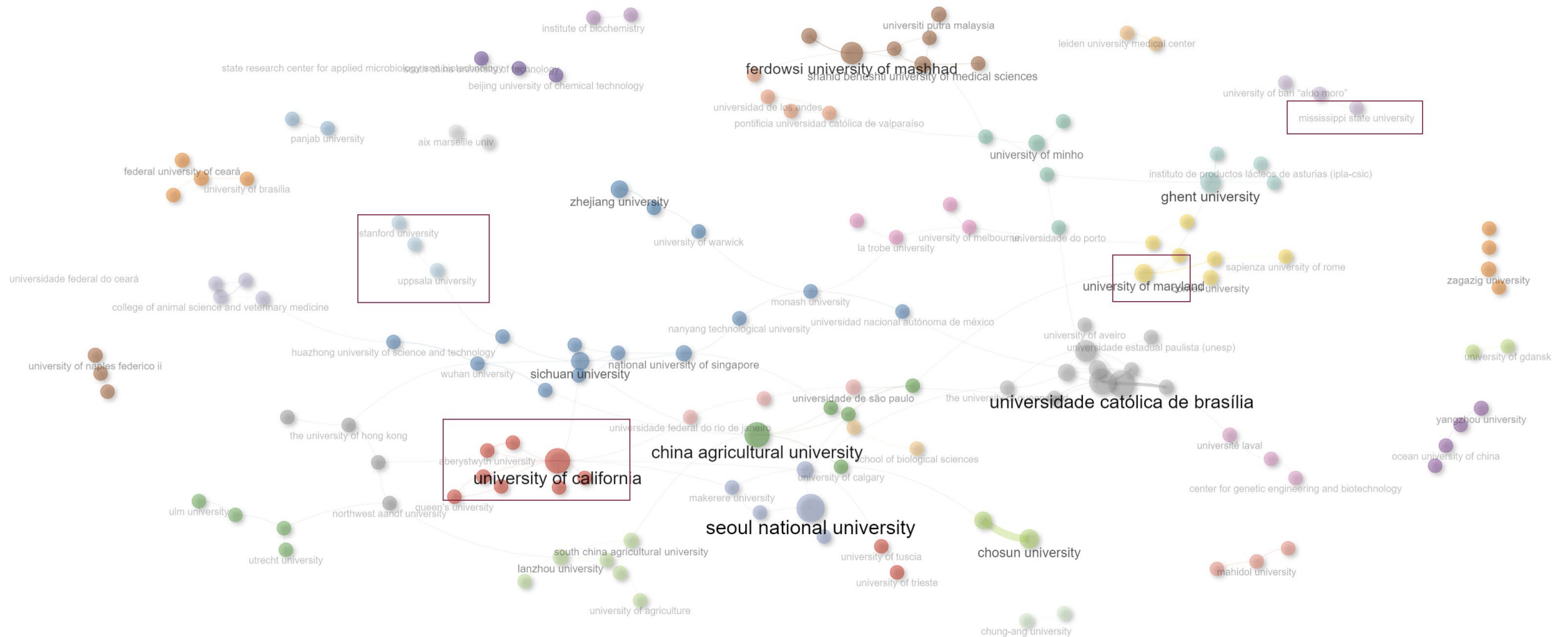
Topic Trends Over Time Based on Researcher Keywords



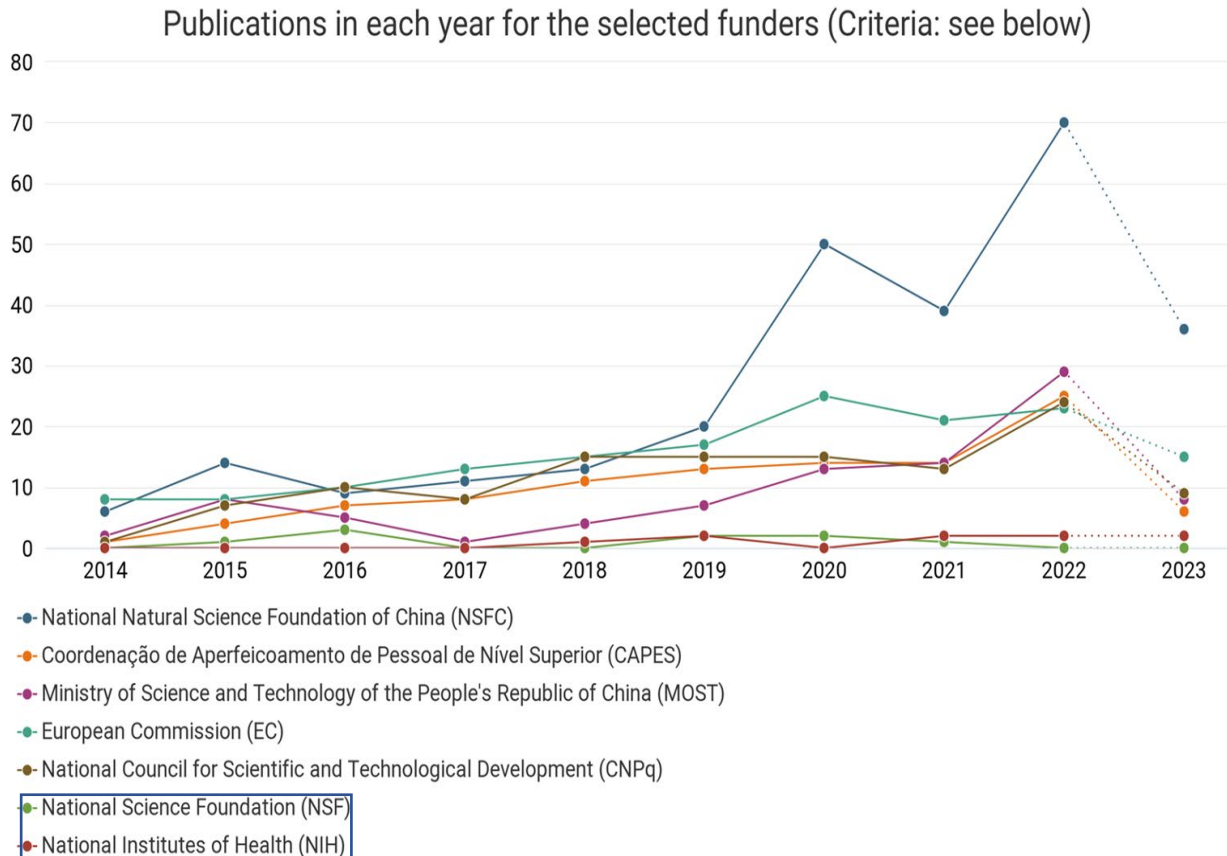
Top 25 Journal Sources



Institutional Collaboration Network 2017 - 2023



Publication Funding Source Acknowledgements



All publications are rather flat until 2019, when again NSFC demonstrates a sharp increase. NIH and NSF associated publications are the lowest among these funders, although this is not necessarily negative.

Source: <https://app.dimensions.ai>
Exported: September 01, 2023
Criteria: ("alternative AND antimicrobial") AND ("alternative biotics" OR "machine learning" OR "artificial intelligence" OR bacteriophage OR "repurposed drugs" OR "antimicrobial peptide" OR "antimicrobial polymer" OR "drug target") in title and abstract.
© 2023 Digital Science and Research Solutions Inc. All rights reserved. Non-commercial redistribution / external re-use of this work is permitted subject to appropriate acknowledgment. This work is licensed under a Creative Commons Attribution 4.0 International License.

Patents Grouped By Patent Families

Name	↓ Patents
Organization, Country	
Jens-Michael M Schröder	5
University Hospital Schleswig-Holstein, Germany	
Johnna K Garrish	4
Agricultural Research Service - Southeast Area, United States	
David Matthew Donovan	4
Beltsville Agricultural Research Center, United States	
Gregory R Siragusa	4
Agricultural Research Service - Southeast Area, United States	
Bruce S Seal	4
Oregon State University Cascades, United States	
Kwang-Min Choi	2
Gyeongsang National University, South Korea	
Hui-Yun Chen	2
Xiamen University, China	
Seong Don Hwang	2
National Fisheries Research and Development Institute, South Korea	
Ke-Jian Wang	2
Xiamen University, China	
Hui Peng	2
Xiamen University, China	
Yan-Chao Chen	2
Xiamen University, China	
Fang-Yi Chen	2
Xiamen University, China	

 ASSIGNEES	▼
United States Department of Agriculture (USDA)	5
United States	
Kiel University (CAU)	5
Germany	
Buckman Laboratories (United States)	3
United States	
Xiamen University (XMU)	2
China	
Gyeongsang National University (GNU)	2
South Korea	
 PLACES	▼
United States	12
China	8
South Korea	6
Germany	5
Italy	2

A large graphic on the left side of the slide, consisting of two overlapping diagonal shapes. The top shape is a lighter blue, and the bottom shape is a darker blue, creating a sense of depth and movement.

Get Involved!
Please sign up to be an ERVA
Champion!



Use your mobile device to scan this QR code and
take a brief questionnaire.



Have a great idea?
Send your idea to ERVA!



Use your mobile device to scan this QR code and
take a brief questionnaire.



Q&A

