

China-ITESM Collaboration

1

Dr. Héctor G. Ceballos
Scientometrics, Research Office
Tecnologico de Monterrey

Purpose

2

- Recommend researchers from 6 Chinese Universities to collaborate with in 4 Strategic Areas for ITESM.

- Shanghai Jia Tong University
- Fudan University
- Tongji University
- Tsinghua University
- Peking University
- Beijing Institute of Technology

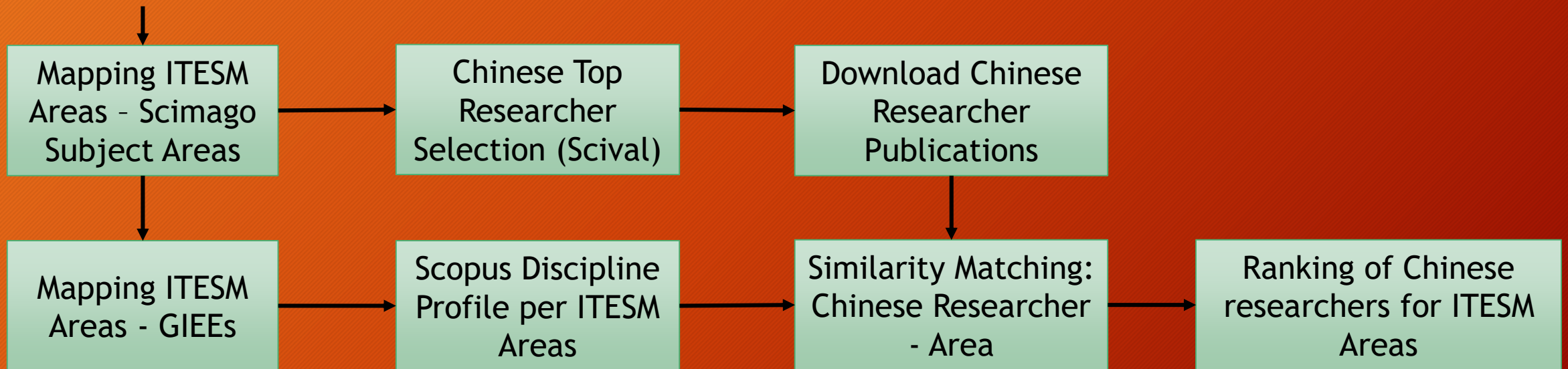


- BIO
- ENERGY
- MATERIALS
- TICs

Procedure

3

ITESM Strategic Areas



Chinese Top Researcher Selection

4

- Up to 10 Top researchers in related areas (Scival).

University	Artificial Intelligence	Bioengineering	Biotechnology	Data Science & Big Data	Energy	Food / Agriculture	Nanotechnology	Water Science and Technology	Grand Total
Beijing Institute of Technology	10	10	10	5	10	2	10	10	67
Fudan University	3	8	8	7	8	2	5	6	47
Peking University	3	7	5	10	1	2	5	2	35
Shanghai Jiao Tong University	3	7	3	5		7	10	4	39
Tongji University	10	10	10	10	10	3	10	10	73
Tsinghua University	10	7	3		1	3	1	4	29
Grand Total	39	49	39	37	30	19	41	36	290

Mapping Strategic Areas - GIEEs

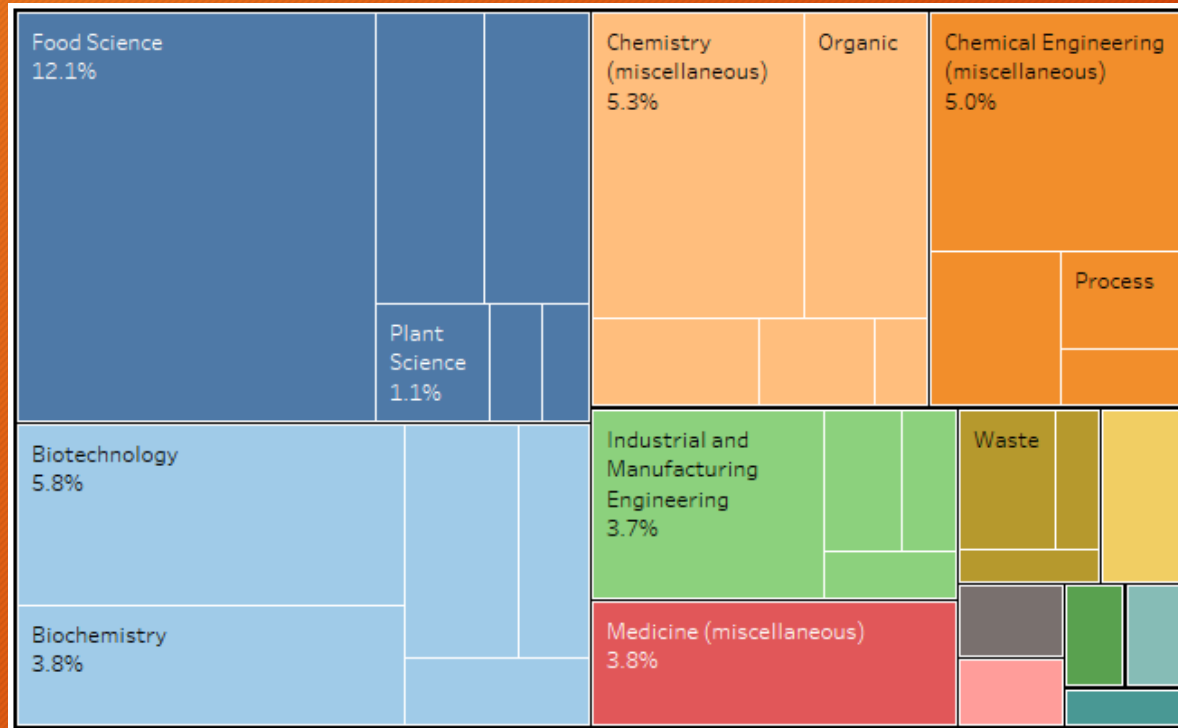
5

BIO	EIC015	Molecular Nutrition
	EIC001	Bioprocesses and Synthetic Biology
	EIC004	Cellular Engineering and Bioreaction
	EIC010	NutriOmics
ENERGY	EIC002	Water Science and Technology
	EIC003	Energy and Climate Change
MATERIALS	EIC013	Sensors and Devices
	EIC008	Nanotechnology and Device Design
	EIC009	Nanomaterials
	EIC011	Optics and Lasers
TICs	EIC014	Intelligent Systems
	EIC016	Computational Learning Models
	EIC017	Telecommunications and Networks
	EIC012	Robotics

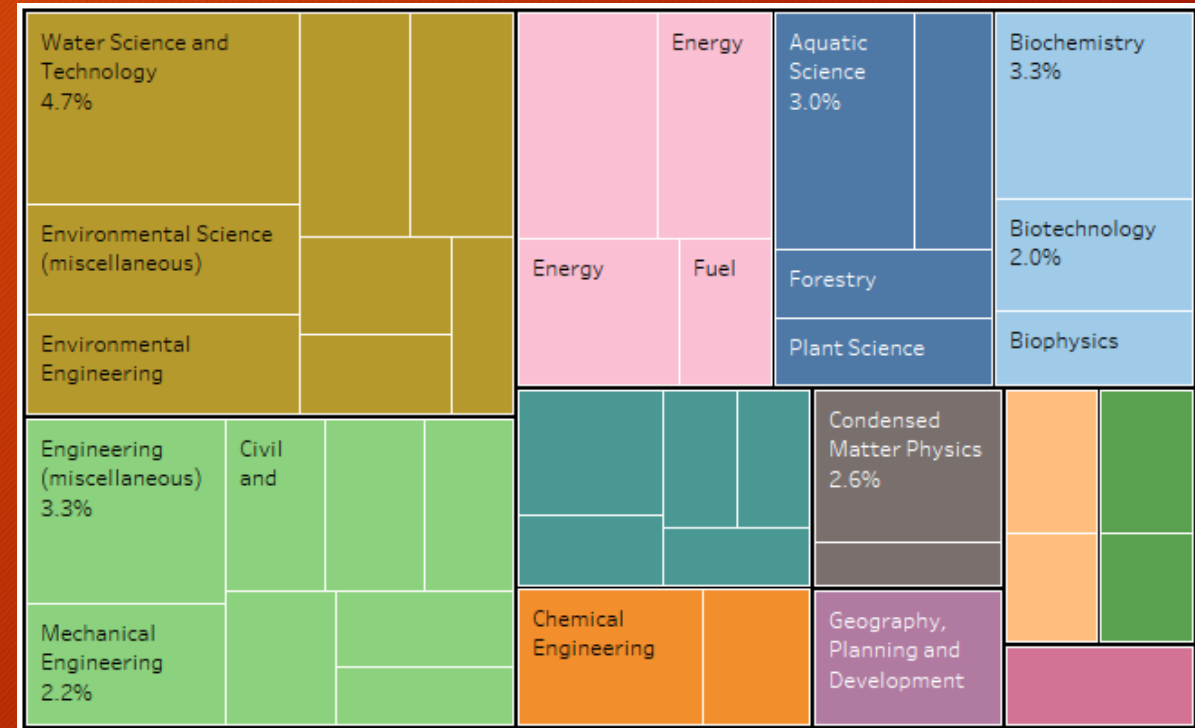
Scopus Discipline Profile per ITESM Area

6

BIO



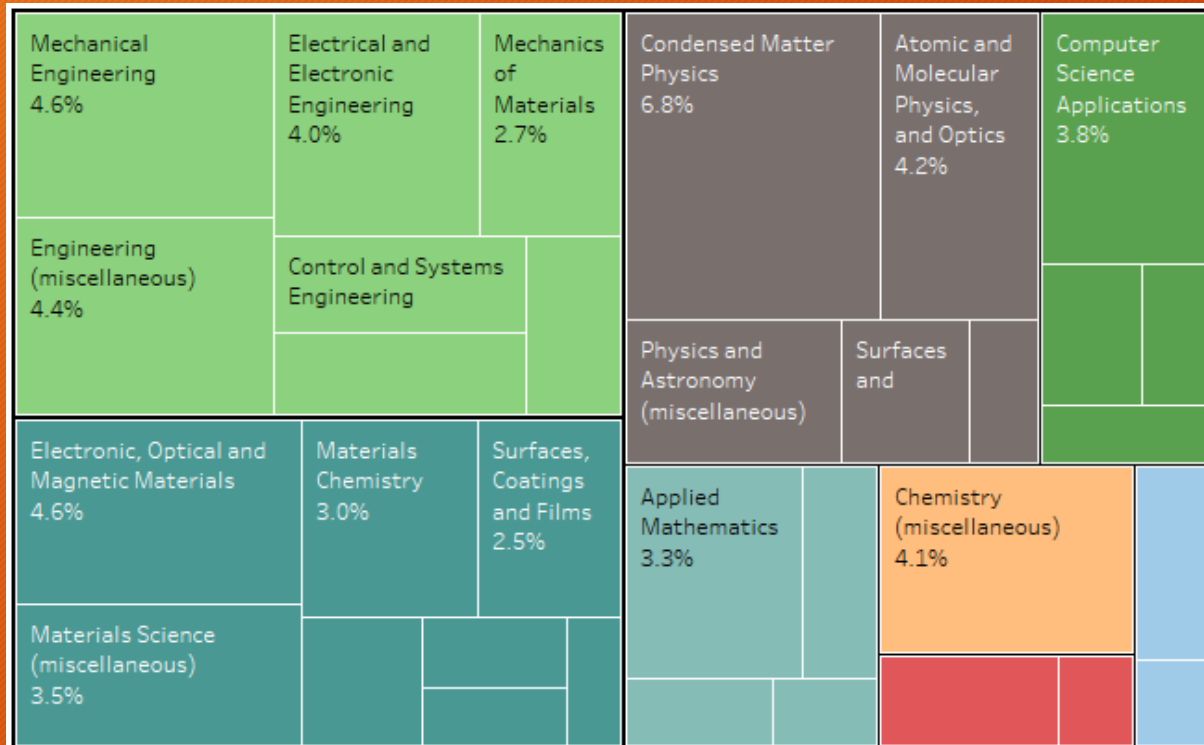
ENERGY



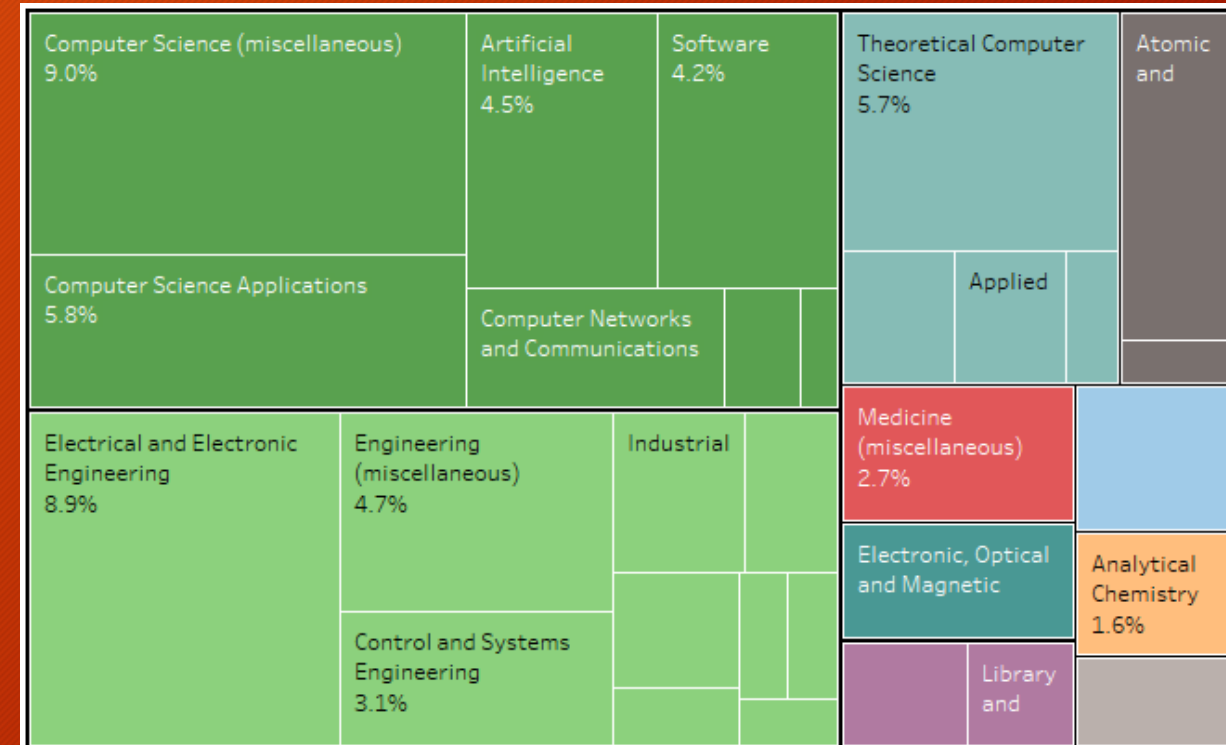
Scopus Discipline Profile per ITESM Area

7

MATERIALS



TICs



Topic Similarity

8

PID	AREA	Expertise
TJ02	Computer Science Applications	0.119
TJ02	Biotechnology	0.098
TJ02	Applied Mathematics	0.063
TJ02	Genetics	0.063
TJ02	Medicine (miscellaneous)	0.049
BIO	Applied Mathematics	0.005
BIO	Biotechnology	0.058
BIO	Computer Science Applications	0.005
BIO	Genetics	0.014
BIO	Medicine (miscellaneous)	0.038



Chinese Researcher	ITESM Area	Expertise Researcher	Expertise Area	Similarity
TJ02	BIO	0.622	0.302	0.406
TJ11	BIO	0.590	0.383	0.465
TJ12	BIO	0.613	0.406	0.488
TJ14	BIO	0.625	0.378	0.471

$$Exp(R) = \sum_T Exp(R, T) \quad \longleftrightarrow \quad Exp(A) = \sum_T Exp(A, T)$$

$$Exp(R, T) = \frac{Docs(R, T)}{Docs(R)}$$

$$Exp(A, T) = \frac{Docs(A, T)}{Docs(A)}$$

$$Similarity(R, A) = 2 * \frac{Exp(R) * Exp(A)}{Exp(R) + Exp(A)}$$

Harmonic mean of both expertise

Similarity Matching: Chinese Researcher - Area

9

- 161 of 290 Researchers were selected and ranked.

University	BIO	ENERGY	MATERIALS	TICs	Grand Total
Shanghai Jiao Tong University	8	2	10	6	26
Fudan University	4	13	5	2	24
Tongji University	8	9	7	17	41
Tsinghua University	9	3		7	19
Peking University	5	3	4	3	15
Beijing Institute of Technology	6	7	10	13	36
Grand Total	40	37	36	48	161

Number of Researchers

Average Topic Similarity

University	BIO	ENERGY	MATERIALS	TICs	Grand Total
Shanghai Jiao Tong University	0.547	0.492	0.622	0.609	0.586
Fudan University	0.459	0.476	0.589	0.530	0.501
Tongji University	0.458	0.506	0.596	0.570	0.538
Tsinghua University	0.522	0.526		0.570	0.541
Peking University	0.478	0.446	0.653	0.625	0.548
Beijing Institute of Technology	0.453	0.472	0.607	0.616	0.558
Grand Total	0.492	0.485	0.612	0.589	0.546

Ranking of Chinese researchers for ITESM Areas

10

Example of Researchers at Shanghai Jiao Tong U. on ENERGY and BIO

University	Area	Code	Similarity	Rank	Researcher	Publications	H-Index	Discipline	Scopus ID
Shanghai Jiao Tong University	ENERGY	CN069	0.518	1	Jiang, Xiumin	186	24	Water Science	55499823900
Shanghai Jiao Tong University	ENERGY	CN125	0.465	2	Shangguan, Wenfer	207	33	Water Science	7004379127
Shanghai Jiao Tong University	BIO	CN212	0.649	1	Zhang, Xuehong	137	20	Bioengineering	7410271092
Shanghai Jiao Tong University	BIO	CN217	0.599	2	Zhao, Xinqing	106	21	Bioengineering	55705113400
Shanghai Jiao Tong University	BIO	CN032	0.595	3	Deng, Zi Xin	350	35	Biotechnology	55540296400
Shanghai Jiao Tong University	BIO	CN181	0.567	4	Xu, Ping	262	41	Bioengineering	55457651200
Shanghai Jiao Tong University	BIO	CN223	0.522	5	Zhong, J. J.	276	44	Bioengineering	7201488646
Shanghai Jiao Tong University	BIO	CN002	0.504	6	Bai, Fengwu	201	26	Bioengineering	55534814800
Shanghai Jiao Tong University	BIO	CN007	0.501	7	Cao, Chengxi	122	19	Biotechnology	7401501762
Shanghai Jiao Tong University	BIO	CN026	0.444	8	Cui, Daxiang	316	50	Biotechnology	35263676000

Author info: <https://www.scopus.com/authid/detail.uri?authorId=55499823900>

Full list at [MatchAreasTec-Chinos v6.xlsx](#)

Micro-evaluation

11

- Dr. Raúl Monroy
 - 5 projects, 14 researchers selected.
 - 48 of 76 Researchers recommended
 - 12 of 14 researchers in the recommendation (86% recall, 25% precision)

Universities	Pre-selection	Recommendations	Real Matches	Avg. Similarity	Min Rank	Avg Rank	Max Rank
Beijing Institute of Technology	15	13	2	0.630	4	5.5	7
Fudan University	10	2	2	0.530	1	1.5	2
Peking University	13	3	1	0.623	2	2.0	2
Shanghai Jiao Tong University	8	6	1	0.612	3	3.0	3
Tongji University	20	17	4	0.626	1	6.8	15
Tsinghua University	10	7	2	0.628	2	2.5	3
Grand Total	76	48	12	0.610	1	4.3	15