



ANNUAL
CONFERENCE & EXPO 2026

A Data-Driven Analysis for Engineering Conferences

The IISE Annual Conference Proceedings (2002–2025)

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IISE Annual Conference & Expo 2026



iise.org/annual

#IISEANNUAL2026

Motivation

Methods

Results

Discussion



Section 1

Motivation

- **23 years** of IISE Annual Conference proceedings (2002–2025) — the modern record of ISE research
- **~9,300** papers capturing emerging topics and community engagement
- Traditional reviews cannot keep up with two decades of thematic shift across the field

Premise

The community needs a systematic, data-driven cartography of its own intellectual evolution.

Curated databases

ProQuest, Scopus, Web of Science

- ✓ Structured metadata
- ✓ High data quality
- × Limited citation links
- × May miss some of indexed papers

Broad-coverage sources

Google Scholar, OpenAlex

- ✓ Wide citation coverage
- ✓ Captures better index
- × Data-quality issues
- × Reproducibility concerns

Implication

Single-source bibliometrics are biased. **Multi-source aggregation** is required for a defensible analysis.

- Prior bibliometric work covers individual ISE subfields (manufacturing, OR, healthcare . . .)
- **No** comprehensive longitudinal analysis of the IISE Annual conference itself
- No systematic mapping of thematic evolution *or* collaboration networks across the modern era
- No publicly reusable baseline that future work can extend or compare against

The missing artifact

A reproducible **baseline cartography** of two decades of ISE research — thematic, structural, and social.

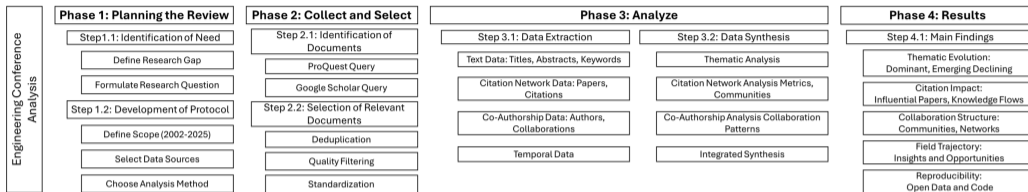
- ProQuest + Google Scholar — structured metadata *and* broad citations
- First large-scale computational analysis of the IISE Annual proceedings (2002–2025)
- **LLM-based classification** + network science + reproducible code, aligned to the **16 IISE research domains** and **246 sub-areas**
- Open dataset (Harvard Dataverse), open codebase (GitHub), interactive **web application**

50-word core

We combine ProQuest and Google Scholar to build the first multi-source longitudinal map of the IISE Annual Conference (2002–2025), using LLM-based classification and network science to chart thematic evolution, influential contributions, and collaboration structure — an open, reproducible baseline for the next generation of ISE bibliometrics.

Section 2

Methods



- 1. Plan** — scope, sources, 2002–2025 window
- 2. Collect** — 9,350 ProQuest + 8,958 Google Scholar; dedupe & filter
- 3. Analyze** — LLM thematic classification, citation & co-authorship networks
- 4. Synthesize** — integrate the three lenses into one cartography

Adapted from systematic-review methodology, instrumented for computational reproducibility.

- Why not BERTopic? — (our exploratory baseline)
194 unsupervised topics required post-hoc mapping; only **31%** similarity to the IISE taxonomy
- **LangChain** pipeline classifying papers into the **IISE Call for Abstracts** taxonomy (16 domains / 246 sub-areas) as ground truth
- Compared local models (Llama, Mixtral, DeepSeek) and cloud models (Gemini)
- **Mixtral 8x22B** selected — equivalent quality, fastest at **9 h 5 m** for the full corpus

Validation against the IISE 2026 CfA taxonomy

Domains (all tested models): $F_1 = \text{Precision} = \text{Recall} = \text{Accuracy} = 1.00$

Sub-areas (Mixtral 8x22B): $F_1 = 0.894$, Accuracy = **0.808**

99% of papers received high-confidence assignments (6,927 of 7,000)

Citation network

- Nodes = papers, edges = citations
- In-degree, betweenness, PageRank
- Louvain community detection
- Reveals knowledge flows & influential papers

Co-authorship network

- Nodes = authors, edges = joint papers
- Degree, clustering coef, eigenvector centrality
- Author disambiguation pipeline
- Reveals collaboration clusters

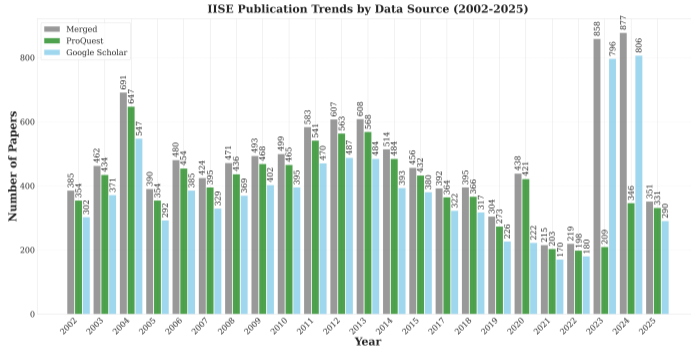
Scale

15,578 unique authors, **41** detected research communities, mean clustering coefficient $\bar{C} = 0.67$ — a tightly knit field.



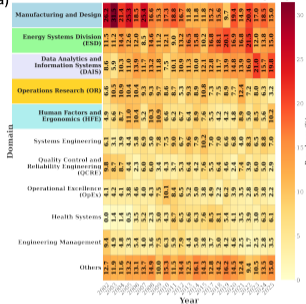
Section 3

Results

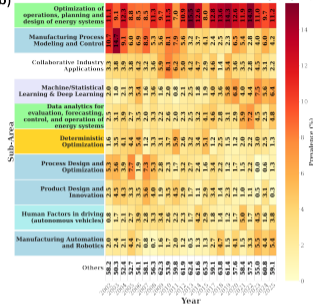


- **~485** presentations / year on average
- Peaks in **2004, 2012, 2023–2024**
- **2016** missing from both indexes
- Phases: expansion → stability → pre-pandemic dip → post-pandemic resurgence

a) IISE Domain Evolution Over Time - Heatmap (Top 10)



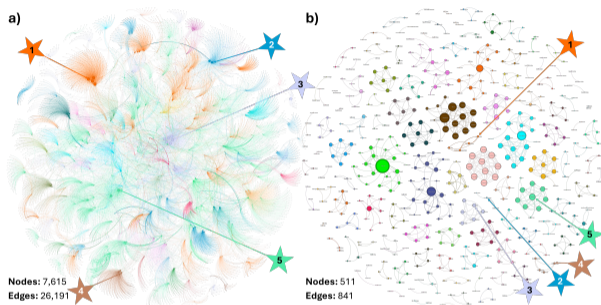
b) IISE Sub-Area Evolution Over Time - Heatmap (Top 10)



- **Manufacturing & Design**
31% (2003) → 15% (2025) shrinking
- **Data Analytics & Info Sys.**
9% → 19% doubled
- **Health Systems**
~1% → 6% emerging
- **ML & Deep Learning** sub-area
now 4.7%

Headline

A measurable **paradigm shift** — from physical processes to data and health systems.



Citation & co-authorship networks (top 200 cited papers)

#	First author (year)	Cit.	Domain
1	Jamshidi et al. (2014)	135	Health Systems
2	Sobek II et al. (2004)	122	Op. Excellence
3	Maftouni et al. (2021)	101	Health Systems
4	Dolinskaya et al. (2011)	97	Op. Research
5	Wang et al. (2015)	96	Health Systems

Most central authors

Degree: **S. Desai** (20)

Eigenvector: **Y.J. Son** (0.34)

Betweenness: **R.A. Wysocki** (0.0018)

Section 4

Discussion

1. **Cartography.**

The first comprehensive 2002–2025 baseline of the IISE Annual — thematic, structural, and social.

2. **Paradigm shift.**

ISE is pivoting from physical processes toward data analytics and health systems. The citation network confirms what the topic model finds.

3. **Tightly clustered community.**

A small-world field — collaborators of a given author tend to also collaborate with each other.

Limitations

- LLM-classification varies across models
- Title + abstract only (no full text)
- 2016 indexing gap
- Cross-source coverage discrepancies

Future work

- **Living analyses** via LLM agents
- Ensemble + human validation
- Extend to **IIE Transactions** (1969–2025)
- Curriculum & research-prioritization tools

Why this matters

A reproducible cartography lets the next study *update* rather than *redo* this work — a sustainable path for monitoring the field.

Open questions

- Does the paradigm shift reverse, or accelerate?
- How does IISE compare to INFORMS, ASME, IEEE?
- Can living analyses keep pace with the field?
- What does the journal-side picture look like?

Explore it yourself

Web app: data-driven-engineering-conferences.github.io | **Code:** github.com/Data-Driven-Engineering-Conferences
Dataset: doi.org/10.7910/DVN/8NYZTI (Harvard Dataverse) | **Contact:** sinan.bank@colostate.edu



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Q&A

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