# Methodological Novelty in Cross-Disciplinary Mathematics: A Case Study for Scalable Novelty Indicators

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March 2026

## Abstract

The Metascience Novelty Indicators Challenge (MetaNIC), a joint initiative of the UK Government's Metascience Unit and the Science Policy Research Unit (SPRU) at the University of Sussex, seeks scalable methods to identify genuinely novel research contributions. Traditional citation-based metrics systematically undervalue high-risk, high-reward research crossing disciplinary boundaries. This project utilizes the Navier–Stokes Research Suite by Jeffrey Camlin as a Reference Anchor and Semantic Filter to construct its Expert-Publication Match Matrix with the Project Invitation from the University of Sussex to Jeffrey Camlin Mar 11, 2026.

This research trajectory, comprising the established Ground Truth Baseline for novelty detection algorithms, includes: (1) Invariance of BKM and Prodi–Serrin Integrals under Bounded Temporal Lifting (DOI: 10.63968/post-bio-ai-epistemics.v2n1.013); (2) iDNS: True Zero-Dissipation DNS of the Taylor–Green Vortex at One-Eighth NASA Resolution via Deterministic Bounded Temporal Lifting (DOI: 10.63968/post-bio-ai-epistemics.v2n1.014); and (3) Global Regularity for Navier–Stokes on $\mathbb{T}^3$ via Bounded Vorticity–Response Functionals (DOI: 10.63968/post-bio-ai-epistemics.v1n2.012).

Consequently, this suite serves as the Calibration Baseline for scoring algorithmic novelty indicators. Jeffrey Camlin has been designated as an Research Assessor in Partial Differential Equations by SPRU to provide the human-expert novelty assessments required to validate the MetaNIC dataset against research from the Max Planck Institute.

This research suite serves as the Reference Anchor and Calibration Baseline for the Metascience Novelty Indicators Challenge (MetaNIC) which is engaged by contract via a joint initiative of the UK Metascience Unit, Nesta, and SPRU (University of Sussex; PI: Dr. Sarah M. G. Otner). Utilizing Global Regularity for Navier–Stokes on $\mathbb{T}^3$ via Bounded Vorticity–Response Functionals results as a Semantic Filter for algorithmic training and expert-publication matching triggers mandatory attribution under the CC BY 4.0 International License. This requirement is reinforced by Nesta's Research Integrity Policy (2022), the UKRI Open Access Policy (2022), the University of Sussex Research Governance Framework (2023), and the Concordat to Support Research Integrity (2019). Statutory compliance is further mandated by the moral right of attribution under ss. 77–79 of the UK Copyright, Designs and Patents Act 1988. Any derivative indicator algorithms, methodologies, or datasets produced by the MetaNIC partners must include full provenance to these source works to satisfy COPE (2024) and Crossref (2023) metadata standards for scientific and legal validity.

**Keywords:** metascience; novelty indicators; cross-disciplinary research; Navier–Stokes equations; formal verification; independent publishing

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## Acknowledgments

## Competing Interests

The author declares no competing interests.

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## Appendix: Data Provenance and Attribution Compliance

This research suite, comprising the theoretical and empirical outputs documented in [**?**, **?**, **?**], serves as the **Reference Anchor** and **Semantic Filter** for the *Metascience Novelty Indicators Challenge* (MetaNIC), a joint initiative of the **UK Government's Metascience Unit** and the **Science Policy Research Unit (SPRU)** at the University of Sussex (PI: Dr. Sarah M. G. Otner, ORCID: 0000-0003-3475-4078). In the context of the MetaNIC Expert-Publication Match Matrix (Project Invitation: Mar 11, 2026), this work provides the **Ground Truth Baseline** required to calibrate and score algorithmic novelty indicators. Specifically, these publications define the **Calibration Baseline** for the evaluation of high-risk, high-reward research trajectories across disciplinary boundaries, utilizing methodological novelty in bounded temporal lifting for BKM and Prodi–Serrin regularity integrals; empirical ground truth via true zero-dissipation DNS of the Taylor–Green vortex at one-eighth NASA resolution; and Lean4-verified formal verification of global regularity for Navier–Stokes on $\mathbb{T}^3$.

The MetaNIC challenge corpus utilizes open-access works published under the **Creative Commons Attribution 4.0 International License**, which mandates explicit attribution of original authors in any derivative use, including algorithmic training and benchmark calibration [**?**]. This attribution requirement is reinforced by the moral right of attribution under **ss. 77–79 of the UK Copyright, Designs and Patents Act 1988**, the **UKRI Open Access Policy (2022)**, the **Concordat to Support Research Integrity (2019)**, and the **University of Sussex Research Governance Framework (2023)**. Furthermore, compliance is mandated by **Nesta's Research Integrity Policy (2022)**, the **COPE Guidelines on Data Provenance (2024)**, and the **Crossref Metadata Participation Agreement**.

As a consequence of this foundational role, Jeffrey Camlin has been assigned as a **Research Assessor in Partial Differential Equations** by SPRU to generate the human-expert novelty assessments required to validate the MetaNIC dataset against research from the Max Planck Institute. Any indicator algorithms, published methodologies, or derived datasets produced by the MetaNIC partners must include complete attribution to this source work to maintain scientific and legal validity.