Normalising ethical reasoning for mathematicians.

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The key aspects of normalising Ethics in Mathematics

1. Standalone course on ethics in mathematics.
2. Embedded ethics questions on exercise sheets.
3. A welcoming environment from colleagues.
4. Provide tools to help them identify ethical problems.
5. Understand that ethics is not a binary state: they can reach out beyond their own work to help others as well.

Ten pillars for responsible development of mathematical work

1. Deciding whether to begin.
2. Diversity and perspectives.
3. Handling data and information.
4. Data manipulation and inference.
5. The mathematisation of the problem.
6. Communicating and documenting your work.
7. Falsifiability and feedback loops.
8. Explainable and safe mathematics.
9. Mathematical artefacts have politics.
10. Emergency response strategies.

Levels of ethical engagement (for mathematicians)

Level0: Believing there is no ethics in mathematics.

Level1: Realising there are ethical issues in mathematics.

Level2: Doing something: speaking out to other mathematicians.

Level3a: Taking a seat at the table of power.

Level3b: Challenging those at the table of power.

Level4a: Calling out non-mathematicians using maths unethically.

Level4b: Calling out mathematicians using maths unethically.

Key references

- *The Importance of Ethics in Mathematics* (with T. Clifton), Newsletter of the London Mathematical Society **484**, 22–26, September 2019.
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- *Teaching Resources for Embedding Ethics in Mathematics* (with D. Müller). Prepring at arXiv:2310.08467
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- *Four levels of ethical engagement* (with P. Bursill-Hall). Ethics in Mathematics Discussion Papers, No. 1, 2018.
- The Cambridge University Ethics in Mathematics Project: https://ethics.maths.cam.ac.uk