"We are building the greatest weapon for oppression in the history of man, yet its directors exempt themselves from accountability."
Edward Snowden.

The NSA and the social responsibility of mathematicians[1]

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In the aftermath of Edward Snowden's revelations, NSA programs have come under intense public criticism. It would seem that the mathematics community had some stake in the matter. Yet the response has been largely uninvolved[2]. If the profession's ties with the NSA raise any ethical concerns, the math community is apparently unwilling to deal with them.

We think there are ethical issues and will argue that we ought not to avert our eyes from them. Recalling Camus's view that "It is the job of thinking people not to be on the side of the executioners," we accept this instance close to home: that mathematicians have a moral obligation to make sure the power of mathematics is developed and used responsibly and not against public interest.

We focus on the NSA since it is topical and not because the misuse of mathematics in this case is unique. One could criticize the way mathematics has been used in many commercial applications [1], in economics, or in finance [2][3]; and we do. However, as Chris Hedges [4] maintains, mass surveillance is an ominous threat to privacy, freedom, and democracy:

> The goal of wholesale surveillance, as Hannah Arendt wrote, is not, in the end, to discover crimes, "but to be on hand when the government decides to arrest a certain category of the population." The relationship between those who are constantly watched and tracked and those who watch and track them is the relationship between masters and slaves.

Mass surveillance is a tool developed secretly, and it is an instrument not of defending society but of covert control of society. Every citizen should be asking how to respond to deal with the threat, but it ought to be of particular concern to mathematicians due to their special relationship with the NSA.

The relationship between the math community and the NSA

There is no doubt that mathematicians are important to the NSA. The NSA is said to be the largest single employer of mathematicians in the world, recruiting many young mathematicians. NSA's ties with mathematical research include running academic programs for students and researchers, allocating grants to individuals, and directly funding research and training in many institutions. At 55 universities designated by NSA as Centers of Academic Excellence, full-time NSA representatives are embedded to "influence research and research partnerships that will impact the cyber world and workforce in the future," as reported in [5]. As a member of the Department of Defense, the NSA is in a key position to influence federal decisions on research funding. The NSA draws on mathematicians for background ideas in cryptography, for implementation in intelligence, for future applications for things like facial recognition, and for other services which we do not know because they won't tell. Whether we admit it or not, we are tied to the NSA.

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2 For example, in the period Jan, 2014–Feb 2015, only 33 individuals with affiliation to mathematics departments have signed the declaration Academics Against Mass Surveillance [6]. In contrast, a petition in support of continued funding for the Institute for Mathematics and Its Applications accumulated over 2000 signatures over the one month period Jan16–Feb16, 2015 [7].

In principle, the NSA is accountable to the US public, but instances are now notorious in which it concealed its actions even from the government. It is in public interest to regulate the NSA to ensure it is held accountable and operate with more transparency. Considering the special relationship between our profession and the NSA, what is the math community's role in dealing with these issues? Should there not be rigorous discourse to examine the assumptions and interests that shape our relationship with the NSA? Is it not a dereliction for mathematicians to defer responsibility to others in the hope that someone else will deal with the issues?

Rights and responsibilities

Mathematicians, even applied mathematicians, often deny responsibility for the uses to which their work may be put. They conventionally operate within a paradigm in which their job is to produce mathematical knowledge, whose later uses they cannot predict. This arrangement dissociates direct responsibility but that does not entitle us to avert our eyes from the misuses of our work. The truism “knowledge can be used for good or bad” ought to be understood as an acknowledgment that we often do not know the consequences of our actions. It does not give *carte blanche* to providing employers and governments with tools which profit them but may harm the world. If they reward us for our participation, this only sharpens our complicity and moral responsibility.

Those mathematicians who work directly for such an organization as the NSA can ask what immediate use is made of it. If we do not want our work to be used for wholesale surveillance, for instance, it may be incumbent on us to ask whether it is suited to such use. Those who enable the hiring of students and colleagues by the NSA can ask whether they are really serving nothing aside from the profession and the job-seeker. But all mathematicians live in, and help steer, a communal activity: the profession as a whole. The social impact of the whole enterprise is something involving each of us.

We are saying that there are acute moral challenges to some mathematicians, but that a more general responsibility inheres simply by membership in the mathematical community. The process of doing mathematics is not always value neutral: the why (to work on something), the what (to work on), and how (to go about it) are all guided by value judgments that influence the direction of research and shape fields of knowledge. Further to the notion that mathematicians can be more responsibly engaged may involve conscientious examining of the frameworks and assumptions in which research is conducted and the wider social impacts of the work.

“First do no harm”

Recall Irène and Frédéric Joliot-Curie: when they became aware that their research might be put to military uses, they placed all of their documentation on nuclear fission in the vault of the French Academy of Sciences, where they remained from 1939 until 1949.

Leo Szilard, one of the instigators of the Manhattan Project when it seemed a needed counter to possible Nazi nuclear arms, later became a critic of the project and worked to oppose nuclear bombing of cities. Joseph Rotblat, one of the first to predict explosions from fission chain reactions, joined the Manhattan Project but similarly resigned rather than serve the bombing of Japan.

These are precedents for trying to keep aware of the consequences of research, and acting on this knowledge. Mathematicians could regard such responsibility as part of the meaning of the name, as medical graduates are expected to regard the status of physician as implying an undertaking to use the expertise for good [12][13]. The minimal version of the ancient oath is, "First do no harm." Even looking only at the conscience of the individual mathematician, we see more issues than refusal to do harmful research. The physician is bound not only to avoid poisoning a patient, but also to avoid training a medical student to poison patients; the mathematician might feel compunctions about turning out PhDs to violate ethical norms. And with NSA money flowing so freely, everyone may hesitate to inquire too closely about where a colleague's grant comes from and how it is earned, at least provided it is legal. Conventional acquiescence shades into collusion. We ask how this reluctance to face the realities of the profession's relation to society can be justified. Surely it is fair to aspire to the objective of a mathematical community which will "do no harm," indeed which will be consistently beneficial. This will require overcoming the reluctance to inquire into the uses of mathematics, and the reluctance to form any judgment on its value.

Since the time when scientists like Szilard and Rotblat spoke up against the danger of nuclear weapons and the damage from nuclear fallout, the debate has occasionally revived. Motions to reduce the profession's dependence on military funding were passed by large majorities in the American Mathematical Society, but they were never implemented by the officers [11] and seem now to be all but forgotten.

Similarly, when the threat of NSA surveillance was brought to public knowledge, a few in our community exposed the way mathematical work was implicated [8][9], and Alexander Beilinson called on the profession to dissociate itself from the agency [10]. Why were the nominal leaders of the profession unwilling?[3] Why do organizations like the AMS, SIAM, and even the Canadian Mathematical Society, welcome recruiters for dubious employers at meetings? It would be more fitting to partner with nonprofit organizations such as the Electronic Frontier Foundation that defend civil liberties in the digital world. If the organizations which nominally represent mathematicians are unable to resist market forces, how can the force of moral criticism like Snowden's be implemented?

Conclusion

> “That we are being propelled in the direction of Brave New World is obvious. But no less obvious is the fact that we can, if we so desire, refuse to co-operate with the blind forces that are propelling us.”
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> Aldous Huxley. *Brave New World Revisited.*

Mathematics is both an art form and an important part of human culture. It has immense power and the ways it is applied can be beneficial or harmful. The mathematics community celebrates its increasing impact in the world, and the privileges that society accords it as a reward. As mathematicians claim credit for the beauty of their science and the fruits it yields the rest of society, they have responsibility for its ill effects as well. As the medical sciences have an obligation to put the health of their patients ahead of the blandishments of pharmaceutical companies, and the psychological professions have an obligation to respect human needs even when governments offer them jobs abetting torture, the mathematical sciences owe it to the society that supports and honors it to ensure that it is on the side of humanity not subjection.

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3 As reported in [5], AMS ex-president David Vogan was appalled at the lack of interest by others in the Society's leadership in making any ethical criticism of NSA--- let alone cutting ties.

Bibliography

[1] Esther Kaplan. The Spy Who Fired Me. The human costs of workplace monitoring. Harper's Magazine. Vol. 330, No. 1978. March 2015.
[2] Mark Rogalski. Mathematics and Finance: An Ethical Malaise. Mathematical Intelligencer 32 (2010), no. 2, 6-8.
[3] Jonathan Korman. Finance and Mathematics: A Lack of Debate. Mathematical Intelligencer 33 (2011), no. 2, 4-6.
[4] Chris Hedges. Edward Snowden's Moral Courage. Truthdig. Feb 24, 2014.

[5] John Bohannon. Breach of Trust. Science Magazine. Jan 2015.

[6] Academics Against Mass Surveillance. http://academicsagainstsurveillance.org
[7] Support the IMA. Online petition urging the NSF to reconsider its decision of to defund the Institute for Mathematics and Its Applications. http://www.ipetitions.com/petition/support-the-ima
[8] Tom Leinster. Maths spying: The quandary of working for the spooks. New Scientist. April, 2014.
[9] Thomas C. Hales. The NSA Back Door to NIST. Noices of the AMS. Vol 61 no 2. Feb 2014.
[10] Alexander Beilinson. AMS Should Sever Ties to NSA. Notices of the AMS. Vol 60 no 11. Dec 2013.
[11] Allyn Jackson. Declining Mathematics Funding at the DoD. Notices of the AMS. Vol 47 no 1. Jan 2000.
[12] Chandler Davis. A Hippocratic Oath for Mathematicians? Mathematics, Education, and Society. 6th International Congress on Mathematical Education. Budapest. 1988. pp. 44–47.
[13] Joseph Rotblat. A Hippocratic Oath for Scientists. Science, vol. 286, no. 5444, p. 1475. Nov 1999.