Institution: De Montfort University		
Unit of Assessment: 11		
Title of case study: Rewriting the Association for Computing Machinery's Code of Ethics		
Period when the underpinning research was undertaken: January 2016–June 2018		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	**Role(s) (e.g. job title):**	**Period(s) employed by submitting HEI:**
Dr Catherine Flick	Reader	1 February 2012–present
Period when the claimed impact occurred: June 2018–December 2020		
Is this case study continued from a case study submitted in 2014? N		

1. Summary of the impact

The Association of Computing Machinery (ACM) is the oldest professional computing organisation with over 100,000 international members. Research conducted by Flick at DMU in collaboration with the ACM's Committee on Professional Ethics informed the rewriting of the ACM's Code of Ethics, which members of ACM are mandated to follow. The Code is considered so significant and relevant in the field that it has also been adopted by other professional organisations such as the International Federation for Information Processing (IFIP).

With professional organisation members publicly held to the Code, it has been used as a benchmark for judging emerging technologies in terms of their ethical compliance, and to publicly challenge technologies that might be ethically problematic, such as in the Google Project Dragonfly case [C10].

2. Underpinning research

The research conducted by Catherine Flick at DMU involved large-scale dialogues and surveys with experts in ethics, law, others interested in the ethical aspects of computing, the membership of the ACM, and the interested public all around the world, in order to understand the societal and ethical landscape of expectations of an international professional organisation in computing.

Using the 1992 ACM Code of Ethics as a starting point, a series of consultations with an expert taskforce (TF), including Flick, were conducted by the Executive Committee (EC) of the ACM's Code Update Team to start the revision of the Code in 2016. The first draft was published publicly by Brinkman et al. in the *Communications of the ACM* (*CACM*) ('Making a positive impact: updating the ACM code of ethics'; https://doi.org/10.1145/3015149), and invited feedback from both members and non-members by email [R6]. After this initial exercise, Flick was asked to participate as a member of the 7-member EC as the only non-American in order to provide a European perspective on the obligations of the Code and to conduct the significant fieldwork required for the next stage. The chair of the EC and co-chair of the ACM Committee on Professional Ethics, writes:

> We knew of the work of Dr Flick from her presentations on ethics of emerging technologies and responsible innovation at conferences such as ETHICOMP, published papers on informed consent in IT and ethics of emerging technologies. [The EC] had clear evidence of her skill and knowledge in the area, of her international background experience, so it was worth ACM's effort to support her international travel to attend meetings in the USA to draft the Code [and] review and evaluate thousands of suggested modifications. [C1]

Prior research conducted by Flick was specifically used to inform the language and intent of the Code from this point onwards, particularly work on informed consent [R1] and ethics of emerging technologies [R2].

Responses to the first draft were collected and analysed by the EC, including Flick, in consultation with TF experts; it was at this point she was also asked to redraft specific sections

of the Code, most notably Principle 1.5, which turned into Principle 1.6 in R3 onwards. The EC held another exercise in 2017 to incorporate the feedback into a new draft, which was once again published with commentary in CACM [R3]. Members of the ACM as well as interested members of the public were invited to comment via a message board. And this time again, Flick was involved in collecting and analysing the data as part of the EC exercise to revise based on the feedback. A third draft was developed and published in early 2018, alongside a qualitative survey emailed to all members that had opted into email contact with the ACM (n = ~75,000, responses = ~4,500) [R4]. The task of qualitatively analysing this enormous set of data was completed by Flick, the results of which were then used by the EC to draft the final version of the Code. This final version was published openly and posted as a booklet with the July 2018 issue of CACM to ~75,000 ACM members [R5]. In this way, Flick's qualitative analysis work directly contributed to the final form of the Code.

From the testimonial of the chair of the EC and co-chair of the ACM Committee on Professional Ethics:

> Dr Flick personally sorted through, organized, and analyzed [the] comments, including three rounds of expert, general public, and member comments, to produce summary sets of documents that were used at the next stage of the Code rewrite meetings. This analysis highlighted some of the elements that we might have otherwise missed, and particularly picked up subtle nuances that were helpful in redrafting aspects of the Code. […] Another of her more significant contributions that is directly evident within the context of the Code is Principle 1.6 [original rewrite by Flick in R3, then amended in R4 and R5] which originally had to do with copyright, patents and intellectual property [as can be seen in [2.1] as Principle 1.5]. […] She was given the task to completely rewrite and internationalize that element so that it would not talk about laws and standards that were US-centric. [C1]

3. References to the research

[R1] Flick, C. (2016) 'Informed consent and the Facebook emotional manipulation study', *Research Ethics*, 12(1): 14–28; https://doi.org/10.1177/1747016115599568

[R2] Stahl, B.C., Timmermans, J. and Flick, C. (2017) 'Ethics of emerging information and communication technologies: on the implementation of responsible research and innovation', *Science and Public Policy*, 44(3): 361–381; http://doi.org/10.1093/scipol/scw069

[R3] Brinkman, B., Flick, C., Gotterbarn, D., Miller, K., Vazansky, K. and Wolf, M.J. (2017) 'Listening to professional voices: Draft 2 of the ACM code of ethics and professional conduct', *Communications of the ACM*, 60(5): 105–111; https://doi.org/10.1145/3072528

[R4] Gotterbarn, D., Bruckman, A., Flick, C., Miller, K. and Wolf, M.J. (2018) 'ACM code of ethics: a guide for positive action', *Communications of the ACM*, 61(1): 121–128; https://doi.org/10.1145/3173016

[R5] Gotterbarn, D., Brinkman, B., Flick, C., Kirkpatrick, M.S., Miller, K., Vazansky, K. and Wolf, M.J. (2018) 'ACM Code of Ethics and Professional Conduct', New York: Association of Computing Machinery; https://www.acm.org/binaries/content/assets/about/acm-code-of-ethics-booklet.pdf

4. Details of the impact

100,000+ ACM members around the world must abide by the Code, which is a condition of their membership and has a strong enforcement policy that is called on if violations are found. Consequences for breaking the Code can result in prohibition from attending ACM conferences or publishing with ACM. ACM publications and conferences are at the top in the field, and are significant publication and dissemination spaces for both academic and industry research, so this provides a significant incentive to take note of and abide by the Code. The Code has been translated into Chinese and Spanish. The acceptance and use of the final version of the Code not only by the leadership and membership of the ACM, but by other professional organisations,

educators, computing professionals and others, shows the impact of Flick's underpinning research and her direct contributions, such as in Principle 1.6, to shaping the final version of the Code [C1].

New members have cited the ACM Code of Ethics as the reason they joined, and existing members have claimed the updated Code as a reason why they are proud of being members of the ACM, for example @andihyson on Twitter stating 'Proud to be new member of The Association for Computing Machinery @TheOfficialACM – The code of conduct [sic] swung it for me' [C2]. This shows the resonance of the Code for professionals who might otherwise have been reluctant to join the ACM.

The IFIP, which represents over 54 countries' professional societies of computing-related industries, is adopting the ACM Code of Ethics as their code of ethics, to exist alongside the national professional societies' codes of ethics [C1]. Other professional organisations have adopted the Code for their own members' use, showing that it has broader appeal than just the ACM [C3]. These institutions are, like the ACM, using the Code as a benchmark for their members' professionalism:

- Association for the Advancement of Artificial Intelligence
- Institute for the Certification of Computing Professionals
- Association for Computational Linguistics
- Association for Software Testing

Conference series (outside those of the ACM) are also beginning to ask that papers submitted to them and conference attendees abide by the Code, for example the Empirical Methods in Natural Language Processing (EMNLP) and Supercomputing (SC) conference series [C3]. These conferences are open not just to academia, but to industry and government as well. Educational institutions around the world use the ACM's Code of Ethics as a basis to teach ethics to school-age, as well as undergraduate and postgraduate computing students. A number of computer science programmes are using the new Code of Ethics in their curricula, with a quarter of technology ethics courses with publicly accessible curricula that teach professional ethics explicitly studying the ACM's Code of Ethics [C4]. In the professional realm, the new Code has inspired people not at all involved in its development to give talks on it to their peers, or use it in continuing professional development, showing the importance to these professionals in not only internalising the new Code but disseminating it themselves to their peers, for example, its use in a DFKompetens Strategic Infosec course [C5], and presentations at USENIX SREcon18 [C6], RubyConf 2018 [C7]. The chair of the EC and co-chair of the ACM Committee on Professional Ethics states that:

> expected further impact includes in education, with the ACM's technical curricula being updated to show the relationship between technical concepts and the principles of the ACM Code of Ethics. The ACM technical curricula include computer science, information science, and software engineering, and are promoted by the BCS (Chartered Institute for IT) as part of its Skills Framework for the Information Age, for university level and professional education. [C1]

On social media, the ACM Code is regularly used to question organisational practices (Twitter search 'ACM Code of Ethics') – even of the ACM itself, for example when they signed a letter in opposition to the OSTP zero embargo proposal in the US (against open access publishing): 'How does @TheOfficialACM signing this statement align with the @ACM_Ethics Code of Ethics? In particular "3.1 Ensure that the public good is the central concern during all professional computing work?"' [C8]. The ACM subsequently retracted their statement and submitted a more nuanced response due to 'concerns from our members' [C9].

The new Code was used by Google employees to adjudicate the ethics of the Google project Dragonfly, which was cancelled after its ethics violations were brought to light [C1, C10], closing (to Google) an advertising market of 772,000,000 Chinese internet users. This shows that although the Code is aimed at an individual level, it has been used as leverage when groups of employees are ACM members and/or feel the Code represents their ethical and moral obligations [C1]. Other organisations such as Guna SPA (Italy) have used the Code to inform

their practices and KPIs, or have adopted the Code internally with assistance from the Committee chair [C1].

5. Sources to corroborate the impact

[C1] Testimonial – Co-Chair ACM Committee on Professional Ethics

[C2] A collection of tweets stating pride in being a member of the ACM due to the Code or that they joined the ACM because of the Code.

[C3] Links to organisations' Codes of Ethics:

Association for Software Testing: https://associationforsoftwaretesting.org/code-of-ethics/

Association for the Advancement of Artificial Intelligence: https://aaai.org/Conferences/code-of-ethics-and-conduct.php

Institute for the Certification of Computing Professionals: https://www.iccp.org/code-of-ethics.html

Association for Computational Linguistics: https://www.aclweb.org/portal/content/acl-code-ethics

International Federation for Information Processing: http://ifiptc9.org/blog/2020/09/24/ifip-code-of-ethics/

[C4] Fiesler, C., Garrett, N. and Beard, N. (2020) 'What do we teach when we teach tech ethics? A syllabi analysis', in the 51st ACM Technical Symposium on Computer Science Education (SIGCSE '20), March 11–14, 2020, Portland, OR, USA, pp 289–295; doi: 10.1145/3328778.3366825 [Conference proceedings available at: https://dl.acm.org/doi/proceedings/10.1145/3328778]

[C5] @stromsjo: I used the #ethics code for my @DFKompetens Strategic Infosec course in September. https://twitter.com/stromsjo/status/1067749616710504450?s=20;

[C6] https://www.usenix.org/conference/srecon18europe/presentation/schlossnagle-0 video available at: https://www.youtube.com/watch?v=UjMo1mgSMDo

[C7] https://www.youtube.com/watch?v=EkHhBpO6Kzo

[C8] https://twitter.com/tnhh/status/1207713258184028160;

[C9] https://www.acm.org/about-acm/statement-regarding-open-access

[C10] https://theintercept.com/2018/08/16/google-china-crisis-staff-dragonfly/