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## **Educational Case Studies on Research Ethics & Responsible Conduct of Research in Multi-Institutional Research Networks**

by Susan M. Wolf\*, Gillian Roehrig\*, Timothy L. Pruett\*, Korkut Uygun\*\*  
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\**University of Minnesota*

\*\**Massachusetts General Hospital and Harvard Medical School*

### **Introduction & Methods**

Scientific and engineering research is increasingly conducted by large, dispersed research networks crossing multiple laboratories, institutions, and disciplines. These complex networks – sometimes called “multiteam systems” or “teams of teams” – are organized systems with multiple components, unified by a shared overarching scientific or engineering goal. There are many examples of these research networks, including Engineering Research Centers (ERCs) funded by the National Science Foundation (NSF).

Despite the rise of “big team science” and proliferation of research networks as a type of “big team science,” few studies have analyzed the challenges faced by such networks as they strive to ensure ethical research and the responsible conduct of research (RCR) across the entire network.<sup>1</sup> When collaborations span large distances, diverse institutions, and multiple disciplines, ethics challenges can proliferate. Researchers and laboratories within the network may have divergent approaches to data sharing before publication. They may disagree on authorship practices. Laboratories may differ in the amount of attention and discussion they devote to ethics and how they see the relevance of ethics and RCR to their work. Even the ground rules for cross-laboratory collaboration can be unclear, inviting conflict. These are only some of the issues that can arise in complex research networks.

The National Science Foundation funded a project to analyze the ethical and RCR challenges arising in research networks and develop tools that networks could use to surface and address these issues. In the project on [NetEthics: Building Tools & Training to Advance Responsible Conduct in Complex Research Networks Pioneering Novel Technologies](#) (NSF Award 2220611), we served as Principal Investigators, using analytic and empirical methods to analyze those challenges. Based on the ethical and RCR issues that network participants themselves identified,<sup>2</sup> we developed **four educational case studies** that research networks can use and adapt to advance dialogue and understanding of network ethics issues. Our goal was to develop case studies that were rich but succinct and could easily be used by a research network in a discussion session of one hour. The cases we developed are fictional; any resemblance to real individuals is unintended.

We piloted a subset of these case studies within an ERC network in an IRB-approved protocol (STUDY00022261) that invited researchers, trainees, and staff across the network (excluding undergraduates, whose contact with the network was more transient) to volunteer. Each group received one case study by email, then met by Zoom for a 90-minute session led by two NetEthics Principal Investigators. We initially confirmed consent and reviewed what participants should expect. Although participants knew that others in the discussion group were from the same research network, we imposed Chatham House Rules, allowing participants to talk about the experience later with others but prohibiting them from revealing the identity of other participants and from attributing any particular comment or position to a participant. Over the

next hour, we took the group step-by-step through the case study and questions posed for discussion. After 60 minutes of discussion, we asked each participant to complete an online survey to give us feedback on their experience. Once all participants had completed their survey, we then invited them to share any feedback or suggestions verbally.

In all three pilot sessions, discussion was robust and the feedback collected by survey was overwhelmingly positive. We also received helpful suggestions. Among the suggestions were that we develop a visual representation of each case to help participants track the laboratories and researchers in the case and make clear how they fit into the bigger network; the figure accompanying each case below is the result. To further assist tracking, all individuals in these cases who are based at the same university have names that start with the same letter as the name of that university (e.g., Drs. Fernandez and Ferris, as well as students Fredrik and Felice are all at Fairmont University). Finally, trainees who do not yet have their terminal degree are identified by their first name, as our discussants piloting these cases frequently distinguished between trainees and more senior laboratory members.

Each case can be used in a virtual or in-person discussion of 60 minutes or longer. A research network can also devote a session to discussion of one or more cases at a larger in-person meeting, such as the network's annual meeting.

We welcome all feedback on these case studies. To convey your feedback or suggestions, please email corresponding author and NetEthics PI Susan Wolf at [swolf@umn.edu](mailto:swolf@umn.edu).

#### **References:**

1. SM Wolf, et al. Filling the network gap in research ethics: Analyzing ethical issues at scale in big team science. *MetaArXiv* [preprint] (Sept. 30, 2025). [https://doi.org/10.31222/osf.io/rc4hw\\_v1](https://doi.org/10.31222/osf.io/rc4hw_v1).
2. G Roehrig, S Rahman, T Pruett, K Uygun, S Wolf. Perceptions of network-level ethics in an Engineering Research Center: Analysis of ethical issues & practices reported by scientific & engineering participants. *Accountability in Research* 2025:1-22. <https://doi.org/10.1080/08989621.2025.2491106>.

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**NOTE: All cases are fictional. Any resemblance to real individuals is unintended.**

## Four Educational Case Studies

### Case Study I: Sharing Data, Protocols & Technologies

- **Ava** is a graduate student in **Dr. Allen's** lab at Argus University. **Amos** is another graduate student in the same lab.
- Ava is collaborating with **Dr. Brown's** lab at Belmont University. **Becca** is a graduate student in Dr. Brown's lab.
- All are part of a research network -- an Engineering Research Center (ERC) crossing 6 institutions. **Drs. Fernandez** (at Fairmont University) and **Clark** (at Carmel University) are the leaders of the ERC.

Dr. Allen's lab at Argus University is working on advanced biopreservation technologies. The lab is part of a network of labs at 5 other institutions that are all part of an Engineering Research Center (ERC). Dr. Allen's lab meets weekly and researchers working on different projects update the group on their progress, sharing raw data freely including prior to publication. Ava is a graduate student in the lab working on a particular project that involves colleagues in Dr. Allen's lab as well as colleagues at another lab in the ERC – Dr. Brown's lab at Belmont University.

1. **Amos is another graduate student in Dr. Allen's lab who is working on a different project. Amos asks to see the raw data** from Ava's project. Ava knows that Dr. Allen supports data sharing, but also checks with Dr. Brown, who instructs Ava **not** to share the data before publication. Ava tells Amos, who complains to Dr. Allen. Dr. Allen is concerned because of the commitment in the Allen lab to openness and data sharing.
  - a. **Did Ava do the right thing? What should Ava do now? Why?**
  - b. **What should Dr. Allen and Dr. Brown do (if anything) and why?**
2. **Ava and Becca (a graduate student in Dr. Brown's lab working on the cross-lab project) are preparing a presentation** on their progress for the ERC's annual meeting.
  - a. **Should they present results that have not yet been published?** They are eager to report their excellent progress but don't want to raise issues or get in trouble.
  - b. After their presentation, others in the ERC who are not on their project ask them questions about their protocol and data. **Can they answer those questions? Are there limits to what they can share? Why or why not?**
  - c. **Should the ERC have guidelines on this? Should the ERC have a process for providing guidance to presenters? What kind of process would be appropriate?**
3. **Dr. Allen suggests to Drs. Fernandez and Clark that ERC progress would be aided by creating an ERC-wide mechanism for sharing data** within the ERC. Dr. Allen suggests building a password-protected platform providing access to data, with clear indication of which scientists generated those data and the status of their publication in progress.
  - a. **Should the ERC create such a platform? Why or why not?**
  - b. **Is there a better way to enable data sharing within the ERC?**
  - c. **How should the ERC leaders handle differences in data-sharing practices from lab to lab? What about projects that cross multiple labs? How should disputes be resolved?**

## CASE STUDY I.

# ENGINEERING RESEARCH CENTER (ERC)

Led by Dr. Fernandez (at Fairmont University) and Dr. Clark (at Carmel University)



ARGUS  
University



BELMONT  
University



CARMEL  
University



DENNIS  
University



ELLIS  
University



FAIRMONT  
University



Dr. Allen's Lab



Dr. Brown's Lab



Ava

(Grad Student)



Amos

(Grad Student)



Becca

(Grad Student)



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### Additional readings on these issues (optional):

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National Research Council. *Enhancing the Effectiveness of Team Science*. Washington, DC: National Academies Press, 2015. <https://doi.org/10.17226/19007>.

## Case Study II. Credit & Authorship

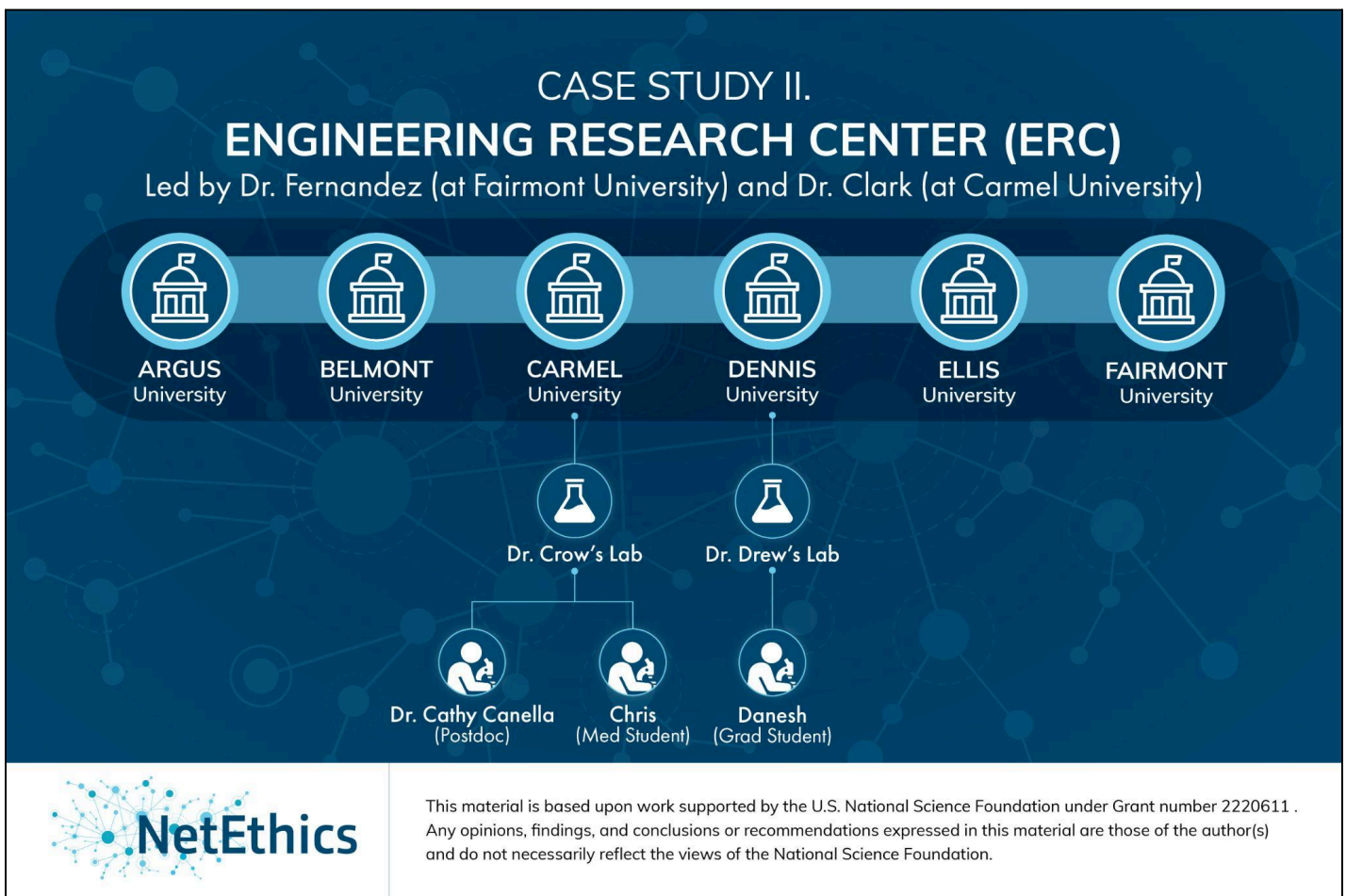
- **Cathy Canella**, MD, is a postdoc in **Dr. Crow's** lab at Carmel University. **Chris** is a medical student in the lab.
- Dr. Canella is leading a cross-lab project involving students and colleagues from **Dr. Drew's** lab at Dennis University. **Danesh** is an engineering grad student in Dr. Drew's lab.
- All are part of a research network – an Engineering Research Center (ERC) crossing 6 institutions. **Dr. Fernandez** (at Fairmont University) and **Dr. Clark** (at Carmel University) lead the ERC.

Cathy Canella, MD, is a postdoc in Dr. Crow's lab at Carmel University leading a project in the ERC on advanced biopreservation. The project involves students and colleagues in Dr. Crow's lab and in Dr. Drew's lab at Denis University. Dr. Crow's lab is heavily comprised of MDs and medical students, while Dr. Drew's lab is dominantly comprised of engineering PhDs and graduate students. The project is yielding exciting results!

1. **A disagreement emerges over publication strategy.** Dr. Drew advocates moving rapidly to publish the early results in an engineering journal. Dr. Canella would like to collect more data and publish a more comprehensive article in a high-impact medical or scientific journal. Dr. Crow sees both arguments and suggests they publish 2 separate articles – an early one in an engineering journal and then a later one in a medical or scientific journal. Dr. Canella is concerned that the early article will in effect “scoop” the later article, creating problems for the later article's placement. Dr. Canella is also concerned about potential violation of journal rules on duplicative publication.
  - a. **What should Dr. Canella do and why?**
  - b. **What should Dr. Crow and Dr. Drew do?**
2. A decision is made to move forward with the engineering article. While Dr. Canella is seen as the first author, several **authorship issues emerge. How should these issues be addressed and resolved?**
  - a. Chris is a graduate student in Dr. Crow's lab who helped Dr. Canella fix problems with a piece of equipment used for measurement. Chris claims **they “had a deal” that promised co-authorship.** Dr. Crow discourages such “deals,” feels that Dr. Crow as PI together with the lead author should determine others' co-authorship based on authorial contributions, and that all lab members should help each other without such promises. However, Dr. Canella is reluctant to alienate Chris, whose help and cooperation Dr. Canella may need in the future. **What should Dr. Canella do? How should Dr. Crow approach the reality of these “deals”?**
  - b. Dr. Drew instructs Dr. Canella to **add to the co-author list a grad student in Dr. Drew's lab (Danesh) who did not make an authorial contribution.** Dr. Canella expresses concern to Dr. Crow, who disagrees with this practice. Dr. Crow urges Dr. Canella to omit Danesh. **What should Dr. Canella do?**
  - c. Dr. Crow and Dr. Drew **both feel they deserve to be listed last as senior author.** Dr. Canella feels that Dr. Crow was substantively involved in the research but that Dr. Drew had very little involvement. However, the research crosses both labs and they are the PIs of the two labs. Both also would like to be listed as corresponding author. **How should this dispute be resolved?**
3. After discussion, Dr. Crow and Dr. Drew still cannot agree on senior authorship. Dr. Drew and Danesh are also dismayed that Danesh has been excluded from

authorship. They **ask the ERC leadership to resolve these disputes**. The ERC leaders – Drs. Fernandez and Clark -- know that authorship practices vary by lab and PI within the ERC. They are also aware of disciplinary differences in authorship norms (e.g., medicine vs. engineering) within the ERC. Finally, they recognize that journals have rules on authorship.

- a. **How should they resolve the disputes over Dr. Canella's paper?**
  - b. **What guidance should they create for the ERC, if any? How can they prevent such disputes?**
4. Dispute resolution has consumed time and Dr. Canella becomes concerned about a research group outside the ERC “scooping” the article. Dr. Canella shares this concern with Dr. Crow, who encourages rapid submission of the article. Although the **journal instructions require sign-off by all authors** on the submitted manuscript and there have been a number of recent edits, Dr. Crow encourages Dr. Canella to “go ahead and submit” as “everyone saw the article a week ago when you shared it and the subsequent edits didn’t change the basic conclusions.”
- a. **What should Dr. Canella do? Why?**



**Additional readings on these issues (optional):**

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National Research Council. *Enhancing the Effectiveness of Team Science*. Washington, DC: National Academies Press, 2015. <https://doi.org/10.17226/19007>.

E Smith et al. Misconduct and misbehavior related to authorship disagreements in collaborative science. *Science and Engineering Ethics* 2020;26(4):1967-93. <https://doi.org/10.1007/s11948-019-00112-4>.

### Case Study III. Ethics & Regulations

**Dr. Eda** is an engineer and PI of a lab at Ellis University.

**Dr. Ferris** is a surgeon and PI of a lab at Fairmont University. **Fredrik** is a medical student in that lab. **Felice** is a graduate student who joins that lab. Both Fredrik and Felice participate in the ERC's summer reading club for trainees.

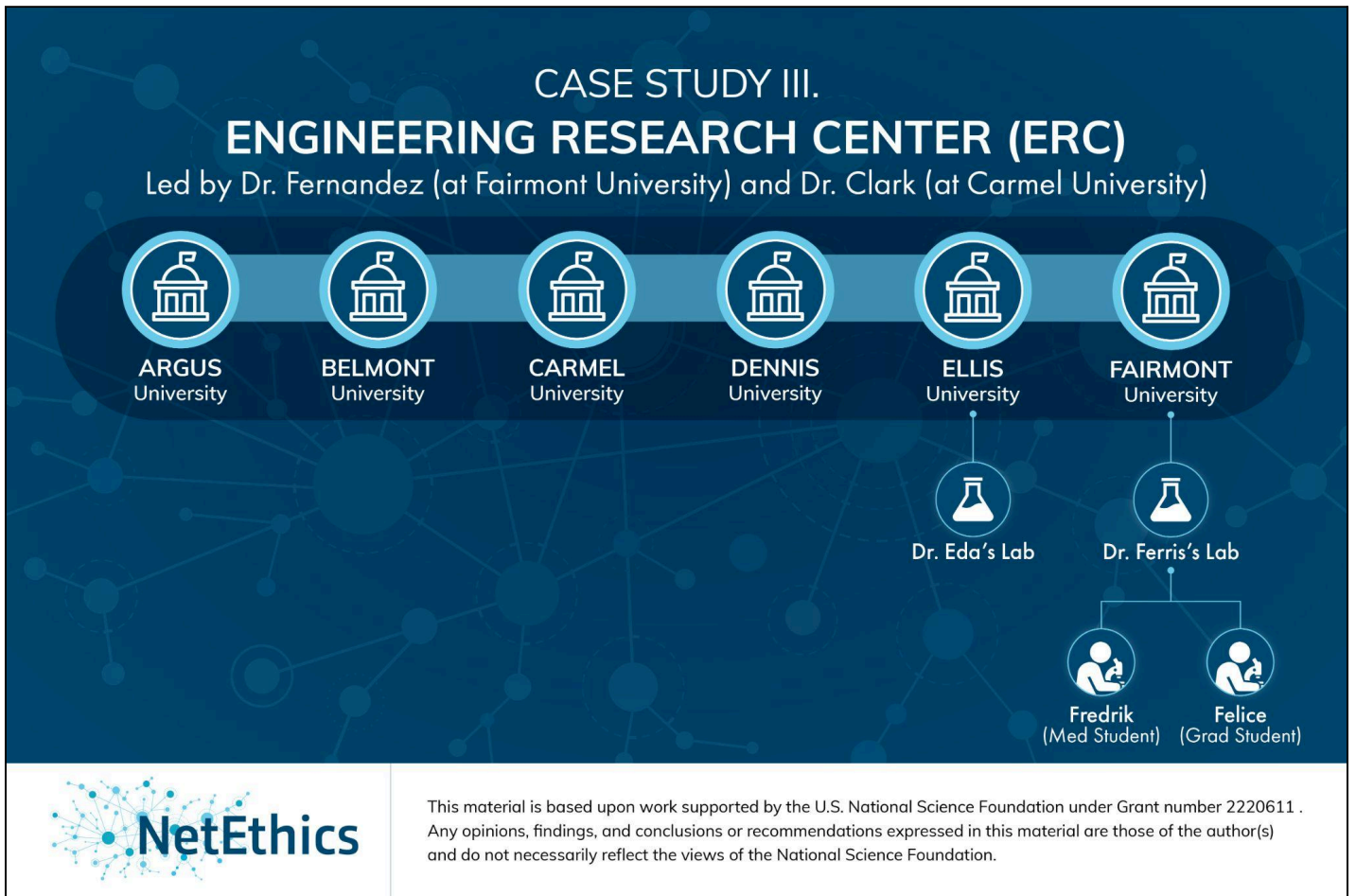
All are part of a research network – an Engineering Research Center (ERC) crossing 6 institutions. **Dr. Fernandez** (at Fairmont University) and **Dr. Clark** (at Carmel University) lead the ERC. The ERC includes **ethics faculty** based at Fairmont.

Dr. Eda and Dr. Ferris are PIs at two different universities (Ellis and Fairmont), who are leading ERC work on biopreservation of solid organs for transplantation. Dr. Eda is an engineer whose lab is developing cooling protocols with infusion of cryoprotective agents as well as rewarming methods. Dr. Ferris is a surgeon whose lab is currently working with rodent livers, applying the Eda protocols to biopreserve, store, rewarm, and then transplant those livers into rats. They hope to progress to larger animals and ultimately clinical trials in human beings. The Ferris lab is reporting exciting success in rat models.

1. Graduate students in the Eda lab are aware that the ERC includes researchers working on ethical issues, but the **students are not sure those ethical issues really apply to their work**. After all, the Eda lab is not conducting research on animals or human beings. The lab holds weekly meetings, but those are devoted to research progress. They ask Dr. Eda if they should be spending time learning about the ethical implications of biopreservation. Dr. Eda reassures them that the lab's work "is quite early in the translational process. We really need to focus on getting the science to work. There's plenty of time to think about any ethical issues later." Besides, says Dr. Eda, "we are good people and our ultimate goal is to save lives with organ transplantation."
  - a. **What should the students do?**
2. Fredrik is a medical student in the Ferris lab. Fredrik has trained to perform surgery on the rats to retrieve and later transplant livers. Fredrik also works with the *ex vivo* organs, applying the Eda protocol. The lab is racing to complete a high volume of transplants in order to publish in a prominent journal. Given the volume of work, Fredrik is relieved to welcome a new graduate student, Felice. Felice is willing to work with the *ex vivo* organs, but **declines to be trained to perform the surgery, based on discomfort subjecting animals to these procedures and euthanizing them**. Fredrik wants to respect Felice's decision, but finds the volume of work too great for one person. Fredrik asks Felice to reconsider.
  - a. **What should they each do and why?**
  - b. **What is the role (if any) for the lab leader?**
  - c. **Should the ERC address these issues more broadly? If so, how?**
3. Felice and Fredrik both participate in the ERC's summer reading club for trainees. The group reads about illegal organ trafficking outside the U.S. The group also reads a report from the National Academies about unfairness in the U.S. transplantation system that disadvantages rural, poor, and historically marginalized patient populations. They ask Dr. Ferris how these issues should affect the work in the lab and ERC. Dr. Ferris thanks them but says **those are ethics questions for later, when the technology is proven and is being applied**. Dr. Ferris says that for now, their ethics job is to follow IACUC rules in working with animals and eventually IRB rules when they get to research with human participants. When Felice and Fredrik talk with trainees in other ERC labs, they hear that those labs are taking the same

general approach. Felice and Fredrik are confused – the **ethics scholars** in the ERC suggest that paying attention to ethics and social issues early in developing a new technology is important, but their PIs seem to disagree.

- a. **What should the students do?**
- b. **What should the ERC leaders do, if anything?**
- c. **What should the ethics faculty do?**



### Additional readings on these issues (optional):

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## Case Study IV. Collaboration

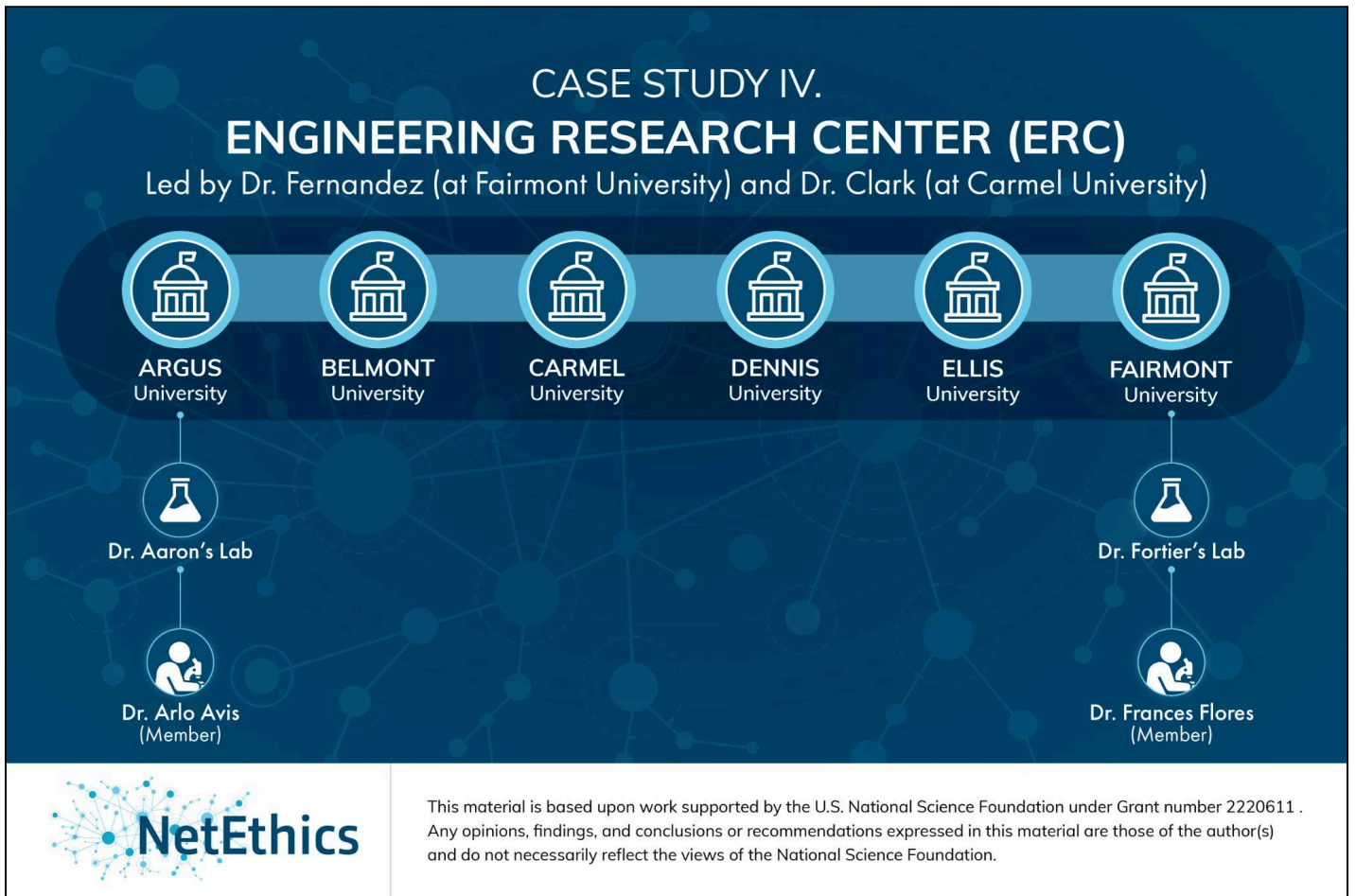
**Dr. Arlo Avis** is a member of an engineering lab led by **Dr. Aaron** at Argus University.. **Dr. Frances Flores** is a member of a lab led by **Dr. Fortier** at Fairmont University. These two labs have recently begun to collaborate. All are part of a research network – an Engineering Research Center (ERC) crossing 6 institutions. **Dr. Fernandez** (at Fairmont University) and **Dr. Clark** (at Carmel University) lead the ERC.

Dr. Arlo Avis is a member of an engineering lab led by Dr. Aaron at Argus University. Long before the ERC was funded and started work, the Aaron lab was known for its research excellence. Dr. Aaron describes **the lab as “a family” where everyone “is friends.”** With the start of the ERC, some members of the Aaron lab (including Dr. Avis) **began a new collaboration with a lab** led by Dr. Fortier at Fairmont University. As Dr. Aaron says, “We are just getting to know the Fortier lab. So far, it’s been just email and Zooming. So we’ll have to see how the relationship develops. Right now, the jury is out....”

1. **Dr. Frances Flores, a member of the Fortier lab, asks to come visit Dr. Avis for a week to observe and participate in research.** Dr. Avis is not sure how to handle this request.
  - a. **What should Dr. Avis do? Are there procedures or data that should not be shared with Dr. Flores? How far should Dr. Avis trust the visiting scientist?**
  - b. **Are there steps that Dr. Aaron and Dr. Fortier should take as PIs to get the relationship between their labs off on the right foot?**
  - c. **Should the ERC have rules or guidance to help build good collaborations across labs?**
2. **Dr. Flores visits the Aaron lab and spends a week working with Dr. Avis. Dr. Flores then returns to the Fortier lab, executes experiments based on procedures learned in the Aaron lab, writes up the results, and submits the paper to a journal.** No one in the Aaron lab is offered co-authorship or credited. When Dr. Avis finds out, Dr. Avis lodges a complaint with ERC leadership and at Fairmont University’s Office of the Vice President for Research. Other members of the Aaron lab are divided on this – some think Dr. Avis is totally justified and has been ripped off. Others think Dr. Avis has been badly treated by Dr. Flores, but that Dr. Avis’s complaints are endangering the cross-lab collaboration and the new ERC. The “family spirit” in the Aaron lab starts to break down, as some pressure Dr. Avis to withdraw the complaints, while others support Dr. Avis.
  - a. **What should Dr. Avis do?**
  - b. **Dr. Aaron? Dr. Fortier?**
  - c. **The ERC leaders?**
  - d. **Is there some way this could have been avoided?**
3. Other labs in the ERC have now heard about this dispute. Reactions vary, but a **number of labs are now more cautious about collaborating across labs within the ERC. Several PIs finally ask to meet with the ERC leadership** to find a positive way forward. They are concerned that the ERC needs ground rules for collaboration, a way to minimize disputes and misunderstandings, and a dispute resolution mechanism that will not “blow up” relationships within the ERC.
  - a. **What should the ERC leaders do?**
4. The ERC holds its first center-wide annual meeting – an in-person meeting at one of the universities in the ERC combining professional meetings and social events. The **unresolved dispute between Drs. Avis and Flores hangs over the whole**

meeting. When asked, various members of the Aaron lab say, “We just don’t trust the Fortier lab. If you want us to work with someone, we have to like them and trust them.” The two labs sit separately at the dinners.

- What should members of the labs do?**
- What should the PIs do?**
- What should others in the ERC, including the ERC leaders, do?**



**Additional readings on these issues (optional):**

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