

Final Report: 2026 IEEE Summer School on Telerobotics and Cyborg Technologies

Tiago H. Falk, Ferat Sahin, and Adrian Stoica

From July 13-17, thirty students from around the globe arrived at the Rochester Institute of Technology (RIT) to attend the 1st IEEE Summer School on Telerobotics and Cyborg Technologies. Students came from all corners of the USA, Portugal, Germany, Nigeria, Canada, and the UK. The school was financially co-sponsored by the IEEE SMC Society, IEEE Future Directions Initiative on Telepresence, and IEEE RAS. The school was comprised of five intense days of lectures by world renowned experts, student presentations about their research interests, as well as a hands-on component where students learned to build user interfaces (UIs) to control multiple teleoperated robots. On the last day of the summer school, three experts in robotic teleoperation judged the created UIs and awarded the two top teams with prizes.

Day 1:

On the first day of the school, we had a morning lecture from Dr. Jessie Chen from the U.S. Army Research Laboratory, who spoke about *Human-Robot Interaction, Human-Machine Teaming, and Agent Transparency*. In the afternoon, we had Prof. Maria Kyrarini from Santa Clara University speaking about *Cognitive fatigue assessment in voice-based human-robot interactions*. Students also had the chance to do their 3-minute thesis presentations, describing their research work and interests.



Figure 1: First day of the summer school with two lectures focusing on the human aspect of telepresence

After the afternoon lecture, we had talks from the international hands-on support team (from Italy, France, Canada, and the USA) who provided lectures on robot teleoperation, UI usability design, Unreal engine, digital twins, and virtual reality as a control modality.





Figure 2: Lectures given by the support team on usability, control, and robot interfaces

Day 2:

On day 2, we had a morning lecture from Prof. Dan Goldman from Georgia Tech (and CEO, Ground Control Robotics) on *Surprises in Self-Deforming Systems* and an afternoon lecture from Dr. Neal Lii from the German Space Agency on *Bringing Telerobotics to Space Missions*. Students continued with their presentations, followed by hands-on work on building their unified interfaces in teams of four.



Figure 3: Second day of the summer school with two lectures focusing on the robotic aspect of telepresence

The afternoon of Day 2 of the summer school coincided with a World Cup semi-final game, so those that were interested got to watch the game together on the big screen(s), while others worked on their projects in the room next door. All were invited to our improvised half-time show, showcasing a dancing humanoid (Booster) and a centipede robot (SCUTL) dancing to the tune of Michael Jackson's *Beat It!*



Figure 4: A much needed break to watch the World Cup semi-final, along with an impromptu robot half-time show

Day 3:

On the third day we had one lecture delivered by Prof. Levi Hargrove, a RAS Distinguished Lecturer from Northwestern University and the Shirley Ryan Ability Lab. His talk was titled *Intuitive Control of Bionic Limbs* and was followed by student presentations. The entire afternoon was dedicated to UI development.



Figure 5: Third day of the summer school with a lecture on cyborg technologies and intense UI building

Day 4:

On the fourth day, our morning lecturer was Prof. Jamison Heard from RIT with a lecture titled *Shared Control with Reinforcement Learning*. In the afternoon, we welcomed Prof. Selma Šabanović from Indiana University Bloomington for her lecture titled *Robots in Social Worlds: Designing HRI with Communities*. Students then spent the rest of the day (until 3am!) working on their UI prototypes.



Figure 6: Fourth day of the summer school was dedicated to lectures on social and ethical aspects of telepresence

Day 5:

On the last day of the summer school, we welcomed Dr. Ashitey Trebi-Ollennu from JPL/NASA, who spoke about *NASA JPL Mars Robotic Missions*, and Dr. Eddie Tunstel from Southwest Research Institute with a lecture titled *Practical Matters in Real-World Telerobotics Applications*. In between lectures, students had a last chance to make updates to their UIs to get them ready for compilation into standalone control interfaces to be used by the judges in the final competition.



Figure 7: Last day of the summer school was dedicated to lectures on real-world telepresence applications

UI Judging:

A judging station was prepared, where three remote operators and an operation manager had to perform a multi-robot search & rescue task. The scenario was the following: a massive earthquake hit and parts of an office building had collapsed; all power was lost. A search and rescue team arrived with two rescue robots to search for survivors in complete darkness. Upon deployment, the “human retrieval” robot lost its light due to a falling object. Hence, the task was to teleoperate the robots in a collaborative manner, where the search robot (equipped with a functioning flashlight) needed to act as the eyes of the retrieval robot. Teams were given five minutes to onboard the operators on their UI. Operators then had 10 minutes to navigate the “rubble” (i.e., chairs) and search for humans (in this case, a baseball) to drag them out of a dangerous perimeter. After the 10-minute operation, the judges evaluated the interface using six categories listed in the table below, namely: task effectiveness, usability & UX, robot-specific design, visual design, innovation, and prototype quality, following guidelines available in the summer school website. Live footage of the rescue was streamed to the lecture hall so everyone could see the action in real-time! To avoid biases, operators changed their roles each time a new team was evaluated.

Table 1: Categories used by the judges to evaluated the developed UIs

Category	Weight	What to Evaluate
Task Effectiveness	25	Can a user efficiently perform multi-robot-related tasks?
Usability & UX	25	Ease of use, navigation, clarity, cognitive load
Robot-Specific Design	20	Handling of robot states, alerts, telemetry, autonomy levels
Visual Design	15	Consistency, hierarchy, readability, aesthetics
Innovation	10	Novel interaction ideas, creative solutions
Prototype Quality	5	Completeness and functionality of the Figma prototype



Figure 8: Judges performing their remote search and rescue task, with live footage streamed to a room nearby

Of the seven teams that were formed in the beginning of the summer school, four were able to compile their final interfaces, while two managed to finish the interface, but were not successful with the compilation. Of the four teams that were evaluated, the team with the highest overall marks was deemed the grand prize winner (team NSNS, with members from the UK, US, and Germany), with the second-place team (team quadPhEKTa, with members from the US and Canada) receiving the runner-up prize, sponsored by Kaptics.



Figure 9: Judges announcing the first and second place teams.

Acknowledgements:

The summer school would not have been possible without the amazing international support team, judges, and sponsors. In particular, we wish to acknowledge Dr. Olmo Moreno, Dr. Mohamad Shhaban, and Dr. Yonas Tefera from IIT, Italy, Daniel Soto from Ground Control Robotics, Dr. Marc-Antoine Moinnereau and Alexandre Oillic from Kaptics, Canada/France, Elsy Melkonian from IEEE Future Directions, and the RIT team for their continued support! We also wish to thank Prof. Stefanie Tellex from Brown University, Dr. Ashitey Trebi-Ollennu, Dr. Neal Lii, and Dr. Eddie Tunstel for serving as judges. Lastly, we wish to acknowledge our financial and technical sponsors: IEEE SMC, IEEE Telepresence, IEEE RAS, RIT, Kaptics, GCR, Booster Robotics, D3 Embedded, Mind Children, and United Robotics Group.





Figure 10: Hands-on part of the school would not have been possible without the amazing support team!

Not all Work – Some Play Too!

There is no doubt that the summer school schedule was intense. Many lectures, countless hours of UI design, debugging, ROS programming, learning UX principles, etc. But several hours were also set aside for socializing, networking, getting career advice, and for making new friends!

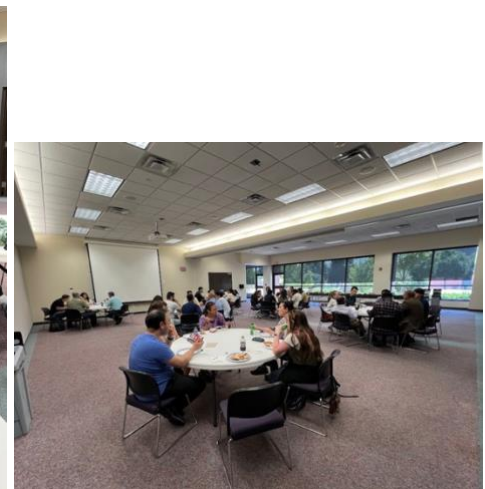
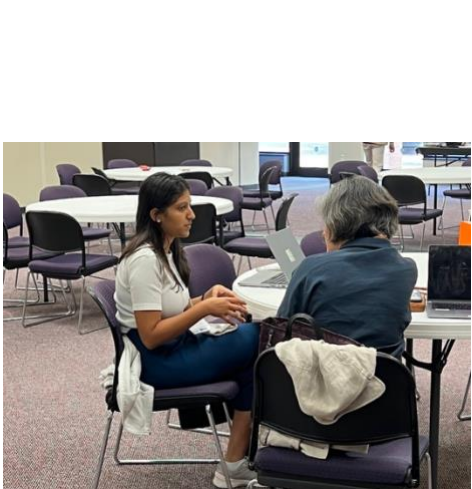


Figure 11: Summer school also had a strong social component with new friendships being made!

Student Testimonials after the school concluded:

**Manuel Couto** · 1st
PhD student at FEUP | Researcher at INESC TEC - CRIIS
1d · 🌐

Just wrapped up an incredible week at the 2026 IEEE Summer School on Telerobotics and Cyborg Technologies at RIT!

A huge thank you to **INESC TEC** for funding this trip and believing in the value of this experience for my PhD research on teleoperation of industrial robots.

Thank you to the organizers and sponsors who made this possible: **IEEE Future Directions, IEEE Systems, Man, and Cybernetics Society (SMCS), RIT Kate Gleason College of Engineering (KGCOE), D3 Embedded, United Robotics Group, Ground Control Robotics, KAPTICS, Booster Robotics and Mind Children**. Special thanks to **Tiago Falk, Dave Magnoni, and Adrian Stoica**, for putting together such a rich program.

Short but intense, this week pushed us hard, from technical lectures to the UII Design Challenge, but it was one of the most rewarding experiences of my PhD so far.

None of it would have been the same without my amazing teammates, **Oluwatoshin Kolade, William Townsend, Debjyoti Sengupta**. Thank you for the collaboration, the late nights, and the laughs along the way.

And a special thank you to **Mohamad Shaaban**, who guided our team through the challenge with more patience than we probably deserved.

Grateful for the people, the ideas, and the robots. Looking forward to bringing what I learned back to my research.

#IEEE #Telerobotics #PhDLife #Robotics #SummerSchool

**Natnael Berhanu Takele** · 1st
PhD Student in ECE - Robotics & AI
2h · Edited · 🌐

Last week, I had the privilege of attending the 1st Summer School on Telerobotics and Cyborg Technologies at **Rochester Institute of Technology** in Rochester, New York. This outstanding summer school was a joint initiative of the **IEEE Systems, Man, and Cybernetics Society (SMCS), IEEE Future Directions, IEEE Telepresence**, and the **IEEE Robotics and Automation Society**.

It was an incredible opportunity to learn from world leading experts in the field, including Dr. **Ashitey Trebi-Ollennu (NASA Jet Propulsion Laboratory)**, Dr. **Neal Lii (German Aerospace Center (DLR))**, and Dr. **Edward Tunstel, Ph.D. (Southwest Research Institute)**, along with many other distinguished speakers. Their lectures and discussions provided valuable insights into the latest advances in telerobotics, telepresence, and cyborg technologies.

I am especially excited to share that our team **#won** the Multi Robot Teleoperation User Interface Design Challenge. This achievement would not have been possible without the dedication and collaboration of my outstanding teammates, **SANG YOON LEE, Niti Poddar, and Sonja Stabenow**. It was a pleasure working with such a talented team throughout the competition.

My sincere thanks to **Tiago Falk, Ferat Sahin, and Adrian Stoica** for organizing such an exceptional summer school. I would also like to thank **Yonas Teodros Tefera, Mohamad Shaaban, Olmo Alonso Moreno Franco, and Daniel Soto** for organizing and supporting the User Interface Challenge. Special thanks to **KAPTICS** and **Ground Control Robotics** for providing us with access to their impressive technologies during the challenge.

Finally, I would like to express my deepest gratitude to Prof. **Ali Karimoddini** and everyone at **ACCESS Laboratory** for their continuous encouragement and support of my academic and research journey. I truly appreciate the opportunity to participate in this remarkable program.

I leave this experience with new knowledge, meaningful connections, and even greater motivation to continue contributing to robotics research and innovation.

**Mohamadamin Rajabinezhad** · 2nd
PhD Candidate at University of Connecticut
19h · 🌐

Last week, I had the privilege of participating in the 2026 IEEE Summer School on Telerobotics and Cyborg Technologies at the **Rochester Institute of Technology** in Rochester, New York.

The summer school brought together students, researchers, and industry professionals for an intensive week of interdisciplinary learning focused on human-centered robotics, robotic systems, cyborg technologies, embodiment, telepresence, and real-world applications. Through expert lectures, research presentations, industry engagement sessions, networking opportunities, and hands-on activities, the program offered a comprehensive perspective on the rapidly evolving field of human-robot interaction.

It was an exceptional opportunity to learn from leading experts, including Dr. **Ashitey Trebi-Ollennu** from NASA's Jet Propulsion Laboratory, Dr. **Neal Lii** from the German Aerospace Center (DLR), and Dr. **Edward Tunstel, Ph.D.** from Southwest Research Institute and Dr. **Daniel Goldman**, along with many other distinguished speakers. Their lectures and discussions provided valuable insights into advanced telerobotic systems, remote operation, intelligent autonomy, telepresence, and human-machine collaboration.

A particularly valuable aspect of the program was its integration of human-centered design principles with practical robotic-system development. The technical sessions covered user-centered design, user personas, storytelling, wireframing, prototyping, usability evaluation, Unreal Engine development, and Data Distribution Service-based communication for distributed robotic platforms. These activities reinforced the importance of designing robotic interfaces that not only provide technical functionality but also support situational awareness, safety, clarity, efficiency, and operator trust.

I sincerely thank Dr. **Tiago Falk, Ferat Sahin, and Adrian Stoica** for organizing this exceptional summer school. I am also grateful to **Yonas Teodros Tefera, Mohamad Shaaban, Olmo Alonso Moreno Franco, and @Daniel Soto** for their guidance and support throughout the technical and hands-on activities. My appreciation also goes to **KAPTICS** for providing participants with access to their technologies and robotic platforms.

Finally, I am sincerely grateful to my supervisor Dr. **'Susan' Shan Zuo** at **University of Connecticut** for her continued mentorship, encouragement, and support throughout my academic and research journey. Her guidance has been instrumental in my professional development, and I deeply appreciate the opportunity to participate in this exceptional program.

This experience broadened my interdisciplinary perspective, strengthened my technical knowledge, and enabled me to build meaningful professional connections. I return with renewed motivation to contribute to the advancement of resilient, intelligent, and human-centered robotic systems.

#Telerobotics #Robotic #Telepresence #CyborgTechnologies #HumanRobotInteraction #HumanCenteredDesign #IEEE #UnrealEngine #Research #CyberPhysicalSystem

**Tolegen Akhmetov** · 2nd
Research Scholar
4d · 🌐

I was fortunate to participate in the **IEEE Telepresence** Summer School. It was a valuable learning experience, with lectures from leading researchers from **German Aerospace Center (DLR)**, **NASA Jet Propulsion Laboratory**, renowned academics, and industry experts.

For the challenge, I thank **Mohamad Shaaban** for patiently explaining how to use Unreal Engine and ROS 2 for robot teleoperation, and **Olmo Alonso Moreno Franco** for the interface classes. I am also grateful to my teammates **Maryam Norouzi, Akash Raje, and Talha Zaidi**. We did not win a prize, but the teamwork and experience were rewarding.

Special thanks to the organizers: **Tiago Falk** for organizing such an outstanding summer school and for his thoughtful advice on academic career development, which inspired me and many other young researchers. Finally, I would like to thank **Ferat Sahin** for hosting the event at RIT. I gained more from this experience than from many hackathons and conferences.

**Sonja Stabenow** · 1st
Research Associate @ TUM University Hospital | Doctoral Candidate ...
3h · 🌐

Had an awesome time at the 1st Summer School on Telepresence and Cyborg Technologies!

Many thanks to **Tiago Falk, Ferat Sahin** and **Adrian Stoica** for making this possible. It was great learning from experts about human-robot interaction, prosthesis development, telepresence and more.

With a great team and late nights we won the challenge on multi robot control together, thank you **SANG YOON LEE, Niti Poddar** and **Natnael Berhanu Takele**. I really appreciated the patience and support during the UII Challenge from **Mohamad Shaaban** and **Olmo Alonso Moreno Franco**.

Being able to get to know the technologies directly from **KAPTICS** and **Ground Control Robotics** was insightful.

Thank you **Prof. Dr. med. Dirk Wilhelm** and **Klaus Bengler** for enabling me to have this experience.

IEEE Telepresence, Rochester Institute of Technology, IEEE Systems, Man, and Cybernetics Society (SMCS), IEEE Robotics and Automation Society

Tamzid Hossain • 1st
Graduate Research Assistant, The Reality Design Lab (Northeastern ...
32m • Edited •

What an incredible week at the IEEE Summer School on Telerobotics and Cyborg Technologies at Rochester Institute of Technology!

I'm proud to share that our team was the runner-up (2nd place) in the Multi-Robot Teleoperation Unified User Interface (UI) Design Challenge. The task was to build a single interface that lets one operator monitor and control multiple robots. We were judged on a search and rescue scenario: finding an object in a completely dark room with many obstacles. We built an operator interface in Unreal Engine 5 that combined DDS-based communication, ROS 2 integration, and live video streaming to control multiple robots from a single application.

None of it would have been possible without my amazing teammates [Eric Godden](#), [Kajal Awasthi](#), and [@Phuong Cao](#) — thank you for the collaboration, the efforts, and the late night crunches.

Beyond the challenge, the program offered an intensive week of lectures and hands-on sessions on telepresence, human-robot interaction, cyborg technologies, and human-centered design, with distinguished speakers from many leading institutions, including [Ashitey Trebi-Ollennu](#) from [NASA Jet Propulsion Laboratory](#), [Neal Lii](#) from the [German Aerospace Center \(DLR\)](#), [Jessie Chen](#) from [U.S. Army DEVCOM Army Research Laboratory](#), [Daniel Goldman](#) from [Georgia Institute of Technology](#), [Maria Kyrarini](#) from [Santa Clara University](#), [Levi Hargrove](#) from [Northwestern University](#), [Edward Tunstel](#), Ph.D. from [Southwest Research Institute](#), [Selma Šabanović](#) from [Indiana University Bloomington](#), and [Jamison Heard](#), Ph.D. from [Rochester Institute of Technology](#). Their incredible lectures covered everything from space telerobotics to prosthetics and human-robot teaming, and I learned something new in every session. Combined with getting to build the entire teleoperation stack from UI down to robot commands, this week completely changed how I think about designing systems where humans and robots work together

My sincere thanks to [Tiago Falk](#), [Ferat Sahin](#), and [Adrian Stoica](#) for organizing this exceptional summer school, and to [Mohamad Shaaban](#), [Daniel Soto](#) and [Olmo Alonso Moreno Franco](#) for their guidance and patience throughout the technical challenge. Thanks as well to [KAPTICS](#) and [Ground Control Robotics](#) for giving us hands-on access to their platforms. Finally, a special thank you to my advisor [Wallace Lages](#) at Northeastern University for sponsoring my participation in this program and for the constant support.

I leave with stronger technical skills, meaningful connections, and real motivation to keep working in telepresence and human-centered robotics.

IEEE Telepresence | Rochester Institute of Technology | IEEE Systems, Man, and Cybernetics Society (SMCS) | IEEE Future Directions | IEEE Robotics and Automation Society

#Telerobotics #Telepresence #HumanRobotInteraction #UnrealEngine #IEEE #Robotics

Niti Poddar • 1st
Product Designer | UX Researcher | MS in HCI@UMD | Prev@Human...
12h •

Two robots. One pitch-black room. One person to find.

Our team took 1st place in the [IEEE Telepresence](#) Multi-Robot Teleoperation Unified User Interface (UI) Design Challenge at the 1st Summer School on Telerobotics and Cyborg Technologies at [Rochester Institute of Technology](#).

The brief: build one interface that lets an operator monitor, control and configure multiple robots from a single application. We chose SCUTTLE and LIMO from the four robots available, built the operator interface in Unreal Engine, and were judged on a search-and-rescue task which was - locating a person in a completely dark room.

As a UX designer who has only worked on digital products, designing for something physical was the hardest and most interesting part. So many more factors shape the experience when the product lives and moves in your environment.

One example: to add a speed bar for novice users, I first had to understand how amplitude and frequency settings affect how fast SCUTTLE actually moves. A bit of physics I did not expect to be doing.

Thank you to my team, [Sonja Stabenow](#), [Natnael Berhanu Takele](#) and [SANG YOON LEE](#). To [Daniel Soto](#) for patiently answering every usability question, and to [Mohamad Shaaban](#) and [Olmo Alonso Moreno Franco](#) for their support throughout the challenge. To [Tiago Falk](#), [Ferat Sahin](#) and [Adrian Stoica](#) for making the summer school happen, and to [KAPTICS](#) and [Ground Control Robotics](#) for the hands-on access to their technology.

This one ignited a real interest in Human-Robot Interaction.

(Speakers and societies tagged in the comments 🗣️)
#HumanRobotInteraction #UXDesign #Telerobotics

IEEE Future Directions
20h •

"If a robot is going to work alongside people, it cannot just be a machine—it has to understand us."

From the IEEE Summer School on Telerobotics, PhD researchers Zeynep and Manali from the @Rochester Institute of Technology break down how they're using LLMs to make humanoid robots like the Booster K1 more trustworthy, natural, and intuitive. Watch the full feature below

[Rochester Institute of Technology](#) [RIT Kate Gleason College of Engineering \(KGCOE\)](#) [Zeynep Kılınçer](#) [Ferat Sahin](#) [Tiago Falk](#) [Dave Magnoni](#)



SANG YOON LEE • 1st
Robotics
17h •

What an incredible experience at the 1st Summer School on Telepresence and Cyborg Technologies!

Many thanks to [Tiago Falk](#), [Ferat Sahin](#) and [Adrian Stoica](#) for making this possible. This summer school made me far more interested in the telepresence and cyborg robotics field than I expected.

What stood out most was that the school went beyond robot control. We built the operator interface ourselves in Unreal Engine, so for the first time I could see the whole loop: what the operator looks at, what they do with it, and how that ends up moving a robot on the other side.

I was lucky to work with a fantastic team on the UI Design Challenge([Niti Poddar](#), [Natnael Berhanu Takele](#) and [Sonja Stabenow](#)). Our task was a search and rescue scenario in a completely dark room with two robots. We used a SCUTTLE to light the way and guided a LIMO through the dark to reach the person we had to find. After a lot of long nights, we won 1st place in the challenge

Thanks also to [Mohamad Shaaban](#) and [Olmo Alonso Moreno Franco](#) for their patience and support throughout the challenge, and to [KAPTICS](#) and [Ground Control Robotics](#) for letting us get hands-on with their technologies.

IEEE Telepresence, Rochester Institute of Technology, IEEE Systems, Man, and Cybernetics Society (SMCS), IEEE Robotics and Automation Society

Relevant Websites:

Main page: <https://www.ieeesmc.org/telepresence/summerschool/>

UI design guidelines : https://www.ieeesmc.org/telepresence/wp-content/uploads/sites/29/2026/07/2026_UI_Telepresence_Challenge_Guidelines.pdf