DIVERS ALERT NETWORK - SkillBridge Program

Divers Alert Network (DAN) is a global organization headquartered in Durham, North Carolina. As the leader in civilian dive safety research, DAN employs and collaborates with dive science experts to conduct research regarding all aspects of dive safety.

Participants will have the opportunity to learn, develop, and enhance professional skills that can lead directly to career advancements in the field of diving research and job placement within DAN.

The successful SkillBridge applicant will participate in activities that originated in the DAN Internship Program. This program was created more than 20 years ago to give qualified candidates valuable experiences in dive safety research. Today — over 100 interns later — the program continues to help people develop the knowledge and skills they need to pursue careers in diving-related and scientific fields.

The DAN SkillBridge participant will work alongside a mentor at DAN Headquarters in Durham, North Carolina for 5-6 months. Participants will work 40 hours per week in person.

Position Training for a Research Assistant in Diving Science

Brief description of the job: The broad goal of training a SkillBridge participant at DAN will be to expand upon this person's existing diving experience and knowledge and apply it to diving research in physiology, population health, and accident investigation. This will include understanding how to generally do good research, independent of diving, primarily focusing on human subject research (e.g. IRB protocols, data collection/storage, statistics). Then observe and participate in our ongoing research activities, with exposure to a range of projects, including the early idea stage, proposal writing, regulatory approval, data collection, data analysis and manuscript writing/presentations. The goal for our SkillBridge team member is to find a good, long-term fit in our Research Department (preferred), another department in DAN, or in another diving research-related field or organization.

SkillBridge participants will:

- Gain a deeper understanding of diving physiology, dive injury monitoring, and current diving research efforts worldwide

- Learn to prepare, plan, conduct, and communicate scientific experiments and take responsibility for their own research project
- Learn data acquisition and research techniques
- Engage with divers while collecting data in the field, and communicate DAN Research endeavors to the dive community at large

Prerequisites:

Service members with experience or expertise in diving, population health, or accident investigation are particularly encouraged to apply. Ideal candidates must be organized, detail-oriented, demonstrate excellent communication skills, demonstrate an established commitment to diving, and be able to clearly communicate how participation in this program will help them achieve their career goals. While diving is not required during the program, all activities are diving-focused, and as such, certified scuba divers with some experience would be most qualified. College education and experience in research is encouraged but not required for SkillBridge participation with Divers Alert Network.

EDUCATION & SKILL DEVELOPMENT

The 24-week training is presented below with 4 major sections. A: Introduction/Onboarding, B: Research Training, C: Diving Physiology and Injury Monitoring, and D: Research Communication

Week	Title of Training Module	Learning Objective
1	A: Introduction to DAN	Obtain an understanding how each DAN department contributes to the broad mission of providing divers with safety and education resources: Medical Services, Safety Services, IT, Marketing, Communications, Member Services, Warehouse/Supplies, Claims, DAN World
2	A: Introduction to DAN Research Team	Understand how the Research Department's charge fits into the broad safety/education mission with DAN by meeting with each research member on and off site. We also want to hear about the SkillBridge participant's diving/research experience in a short presentation that is designed to engage discussion.
3	A: Introduction to History of Diving Research	Learn about the relatively recent history of understanding the physiology of diving and how to make it safer. Understand the history of DAN's Research Department and its evolution. The book Chamber Divers (Rachel Lance) will be assigned

		reading with the intern giving a brief presentation and leading a discussion.
4	B: Research Training in Ethics	CITI (Collaborative Institutional Training Initiative) on the history of human research, why and how oversight of human research began, research participant privacy, what is an Institutional Review Board (IRB), and a brief introduction into IACUC/animal research.
5	B: Research Training in Ethics (cont)	The basic CITI training in Biomedical Research is long and challenging. It is important to offer enough time to do this well. It will include modules in Information/Data Privacy and Security and Responsible Research Conduct. CPR certification will also be incorporated into these two weeks.
6	B: Research Training with Collaborating Organizations	Visit Duke University's historic hyperbaric chamber and meet with collaborating physicians. Visit UNC-Chapel Hill's Department of Radiology for an introduction into their development and use of ultrasound technology as a foundational data collection tool (in diving and other medical fields).
7	B: Research Training in Data Collection	CITI training module on Study Design. Introduction to RedCap data collections software and hopefully DAN's database that is currently in development.
8	B: Research Training in Ultrasound	Using ultrasound to image bubbles in the right ventricle of the heart to rate and quantify post-dive venous gas emboli (VGE) is a necessary precursor for decompression sickness. How to use an ultrasound machine, imaging of the heart, rating andand collecting other physiological vitals (heart rate, blood pressure, saliva/blood/urine collection) will be taught.
9	B: Research Training in Statistics	CITI training Essentials of Statistical Analysis and an introduction to T-tests, One/Two-Way ANOVAs using statistics software packages Graphpad, SPSS or SAS.
10	B: Research Training in Statistics	Introduction to qualitative/ordinal data used for grading VGE severity. Perform statistical analysis and presentation with existing studies.
11	B: Research Training at local dive sites	Much of our research is performed at a local quarry where we have established dive protocols that are safe (unlikely to cause DCS), but can induce VGE in some/majority of divers. This research often happens on the weekends. There will be at least 5 days (likely more) of research/data collection at dive sites during the 24-week training process.
12	B: Research Training Catch Up Week	The proposed training is rather dense and to do this well, a week to catch up or reinforce topics is prudent.
13	C: Diving Physiology Decompression Sickness History	Study the history of discovery and understanding of dive related physiology/medical problems. This will

		begin with caisson disease (the bends), the progress of mitigation. We will return to Chamber Divers and discuss how preparations for D-Day advanced diving physiology.
14	C: Diving Physiology Decompression Sickness	Read and discuss summaries and research papers of all aspects of decompression sickness (Type 1 and Type 2). How is research mitigating risk for commercial, military, technical and recreational diving.
15	C: Diving Physiology Nitrogen Narcosis and Oxygen Toxicity	Nitrogen Narcosis and Oxygen Toxicity and the math that generate dive computer profiles to avoid such conditions.
16	C: Diving Physiology Continued	The trainee will explore other aspects of diving physiology/medicine of their interest with a new topic or going into more depth with what has already been discussed.
17	C: Diving Physiology Morbidity and Mortality	A primary mission of DAN's Research Department is to tack and compile data on scuba and free diving related deaths. The Medical Department plays a critical role in tracking and understanding medical issues arising from diving accidents.
18	C: Diving Injury Monitoring	Database management for ongoing initiatives in dive accident and injury surveillance and investigation.
19	C: Diving Research Other Applications	Hyperbaric Medicine and the Spaceflight/EVA environment
20	D: Research Communication- Writing an IRB proposal	The trainee will take a real or hypothetical research study from the beginning to end, starting with getting IRB approval.
21	D: Research Communication- Writing and Reviewing a Grant Proposal	DAN's Research Department both offers and applies for research grants. We will go through the process of writing and reviewing these grant proposals
22	D: Research Communication: Presenting Study Results/Data	The trainee will compile graphs and put together a power point presentation of an ongoing research study.
23	D: Research Communication: Writing a Manuscript/Abstract/Journal Article	The trainee will write a research abstract to present at a conference and begin to compile all of the components for a manuscript/journal article.
24	D: Research Communication- Final Presentation	The trainee will give a talk to the whole research department and other DAN employees discussing the training process and areas to improve.

Mandatory course component	**Learning objectives**
Collaboration and engagement with other DAN departments, employees, interns, scholars, and external collaborators.	Gain an in-depth understanding of DAN's mission, Familiarization with the wide network of diving scientists nationally and internationally

Diving Science and Diving Technology lecture series	Develop an understanding of the scope of diving science
CITI Programs Certification	Develop an in-depth understanding of ethical considerations for working with human subjects and vulnerable populations.
DAN Field Research Operator training (32 hours)	Gain basic knowledge regarding ethical considerations in human subject research, field research planning and project management, recruiting of volunteers and participants, and familiarization with devices to collect, process, and store physiological and medical data and biospecimen.
DAN Early-Career Researcher Development Program (32 hours)	Develop professional skills and knowledge including public speaking and presentation skills, project- and time management, grant-writing, peer-reviewed publication, networking, and self-marketing.
Diving First Aid for Professionals certification (16 hours)	Develop skills and confidence to act in emergency situations requiring life-saving actions with a specific focus on accidents in and around aquatic environments.

Optional activities/training (based on interest, availability, and timing)	**Learning objectives**
Scientific writing opportunities as well as authorship of blog posts, Alert Diver magazine articles, and DAN's media channels.	Experience in writing and editing content for various audiences.
Field research events	Refine networking and hands-on research skills in the field
Participation in scientific conferences	Presenting research findings to peers and networking
Visit laboratories, hyperbaric chambers, or cylinder manufacturing plant	Gain insights into various components of the diving safety industry.
PSI/PCI Training	Training in visual cylinder inspection, O2 cylinder cleaning and valve repair
Dive training tailored to the applicant's knowledge and skill level	Enhance diving skills with qualified members of the research team

Teaching Staff/Faculty:

- Dr. Frauke Tillmans, VP DAN Research, oversees human subject research, injury monitoring initiatives, and population health projects, the research grant program, and STEM initiatives at DAN, dive instructor
- Dr. Emmanuel Dugrenot, DAN Senior Researcher, expertise in diving physiology, dive instructor trainer

- Dr. Ted Bateman, Senior Researcher, expertise in extreme environment physiology and biophysics, and bioengineering
- Catherine Harris, Research Associate, expertise in injury and fatality monitoring
- Madeline Coombs, BA, Research Associate, expertise in field research
- Francois Burman, VP Safety Services, hyperbaric safety and diving operator safety initiatives
- JoAnn Perry, Director Training, first Aid for diving professionals
- Various staff members in their function at DAN

Grades

The majority of courses delivered at DAN or with collaborators are pass or fail, some with written (multiple choice) exams. In the rare event of a failed course, unfamiliar content and knowledge gaps can be reviewed with an instructor and the participant may retest.

Accredited Courses

DAN Field Research Operator (DAN specific, prerequisite to participate in DAN field research)

DAN Early-Career Skill Development (DAN specific)

CITI human subject research ethics training (widely acknowledged and often mandated by academic institutions)

PSI/PCI cylinder inspection course (PSI/PCI proprietary course, widely acknowledged in the diving industry in the United States)

Diving First Aid for Professionals certification (equivalent to first aid courses in basic life support and CPR by the AHA, USCG, and other global organizations)

Various seminars held at DAN allow for application for CME (continuous medical education) credits for medical professionals.