



Nanotechnology Enabled Water Treatment Center

NEWT Testbeds

for Research Collaboration, Innovation & Education

What Is NEWT? What Are NEWT Testbeds?

NEWT is a National Science Foundation Engineering Research Center (ERC) comprised of four academic institutions – **Rice University, Arizona State University, University of Texas – El Paso, and Yale University.** Over a 10 year period, the ERC will receive \$37MM from NSF for research in four different areas – Multifunctional Nanomaterials for Removing Priority Pollutants, Nanophotonics-Enhanced Water Purification, Scaling and Fouling Control and Safety & Sustainability. NEWT's

vision is to enable access to suitable water quality almost anywhere in the world by developing next-generation, easy-to-deploy water treatment systems enabled by nanotechnology. Research teams within the center are developing high-performance materials and treatment systems with interchangeable modules that are highly efficient in targeting priority pollutants while offering flexibility needed to tap unconventional water sources and respond to changes in source water characteristics or treatment



objectives. Thus, NEWT enables “fit for purpose” treatment. NEWT's testbeds, including MobileNEWT, NEWTSkid, and DesaliNEWT, are unique resources used by center researchers and industrial collaborators to demonstrate and test these new technologies for drinking and industrial wastewater treatment applications. **NEWT Testbeds enable, and are available for, ‘win-win’ collaborations that drive transformational industrial, innovation and educational outcomes in the US and worldwide.**



MobileNEWT Testbed

With MobileNEWT, your organization can partner with NEWT’s research teams to test new innovations and processes for drinking water treatment. **Dr. Shahnawaz Sinha of Arizona State University** is our lead MobileNEWT researcher who will work with you to develop a collaboration plan to fit your technology evaluation and testing needs.

MobileNEWT Value

Collaboration

MobileNEWT is a trailer-based testbed for new nano-based processes, engineered nanomaterials and other nanotechnologies developed at bench scale for drinking water applications. Commercial partners are using MobileNEWT to assess technologies that have been integrated into modular drinking water treatment systems and placed within MobileNEWT for testing in various field settings for extended operational periods. Testbed collaborations with MobileNEWT facilitate continuous flow studies in the field to support translation of technologies to real-world use.

Innovation

Within NEWT’s cross-institutional teams, faculty and students are focused on development of high-value innovations that address critical academic research

and commercial needs – MobileNEWT is essential in this value-add innovation process. Several nano-enabled water treatment technologies have been installed in MobileNEWT, including reverse osmosis membranes coated with nanomaterials, nanocoated photocatalysts and a nanobubble generator hybridized with modular pre-/post-treatment systems. These are just some of the technologies under test that are driving substantive advances within NEWT and in the broader water treatment innovation ecosystem.

Education

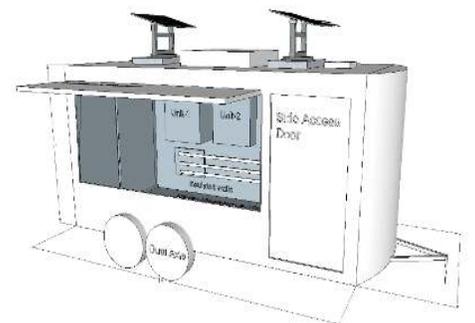
As an impactful learning and knowledge-sharing platform, MobileNEWT offers problem- and service-based educational opportunities for students as well as researchers. MobileNEWT also facilitates wider training for the general public and enables water treatment and greentech information accessibility in a range of communities, no matter their size or location.

Key Benefits

- Test nanotechnology-integrated modules for comparison with products already on the market
- Demonstrate operational feasibility for nano-based technologies in field settings
- Obtain data to refine techno-economic analyses and scale-up
- Train treatment system operators in a mobile testing unit

Contact

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MobileNEWT Testbed – Full View

NEWTskid Testbed

Whether you need rapid industrial testing and validation with an industrial water or wastewater, or long-term studies in collaboration with academic experts in water treatment, we can help. Contact our lead NEWTskid researcher, **Dr. Ibrahim Abdallah of Rice University**, to create an industrial water testbed plan that addresses your important testing needs.



NEWTskid Value

Collaboration

NEWTskid provides an off-grid, mobile platform for collaborations involving evaluation and testing of new industrial water treatment technologies. This unique testbed is a skid-mounted, completely solar-powered, pilot-scale industrial wastewater treatment system with a maximum treatment capacity of 5 L/min. NEWTskid can include pre- and post-treatment modifications and can be further adapted to integrate a range of advanced, modular water treatment units.

Innovation

NEWTskid testbed is the final development stage for technologies having industrial wastewater treatment applications and represents a critical 'Go/No-Go' decision point before technologies under development are 'graduated' to the highest Technology Readiness Levels (TRLs) recognized within

NEWT's research process. Industrial partners, particularly industry research sponsors, rely on NEWTskid as a critical checkpoint where sponsored research findings are validated. Research findings may be reported to a sponsor for its internal business use, and findings may also be published jointly with academic partner institutions.

Education

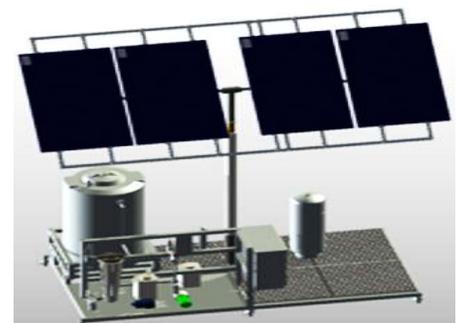
In addition to being an integral part of NEWT's portfolio of innovative resources for addressing critical industrial wastewater treatment challenges, NEWTskid also serves as a tool for educating students. NEWTskid projects provide opportunities to train the next generation of leaders in fields where water treatment is a priority. Our students learn essential research and problem solving skills from faculty, research staff and corporate sponsors as part of their training and are available as excellent candidates for internships and post-graduate professional employment in industry.

Key Benefits

- Off-grid, fit-for-purpose treatment and reuse capability with real industrial waters
- Mobile – easy to deploy
- Solar-powered, thus energy-efficient
- Modular and flexible
- Obtain data to refine techno-economic analyses and scale-up

Contact

Dr. Ibrahim Abdallah
iaa1@rice.edu



NEWTskid Rendering



DesaliNEWT Testbeds

We are eager to partner with you to develop new desalination techniques, devices and systems enabled by nanotechnology. Contact our lead DesaliNEWT researcher, **Dr. Shane Walker of University of Texas at El Paso**, to discuss technology development and test collaborations for commercial, municipal and industrial desalination and water reuse applications.

DesaliNEWT Value

Collaboration

DesaliNEWT testbeds offer a range of testing and evaluation platforms that may be used with commercial entities, government agencies and non-profit organizations. Our research teams are currently working with for-profit and non-profit partners on long-term modeling, testing and demonstration projects that provide significant value for both academic research and the corporate bottom line. NEWT's goal is to continue these collaborations and engage with new partners to drive further advancements in desalination and potable water reuse technology development for broad societal and commercial impact.

Innovation

The DesaliNEWT research team at the University of Texas at El Paso (UTEP) is a NEWT innovation hub

with three testbed systems: a low-energy electrodialysis pilot at El Paso Water's Kay Bailey Hutchison desalination plant; a high recovery, zero-liquid-discharge and direct potable reuse pilot at El Paso Water's Hickerson wastewater treatment plant; and a solar-powered photovoltaic-thermal (PVT) desalination pilot at the Brackish Groundwater National Desalination Research Facility (BGNDRF) in Alamogordo, NM. Future DesaliNEWT research will include testbed integration of electrocatalysis for treatment of nitrate and other priority water pollutants.

Education

Education within NEWT goes beyond classroom instruction and extends to lessons taught through hands-on training, with real-world challenges. DesaliNEWT is integral to this mode of training, where students gain experience in addressing critical desalination needs while furthering their graduate or

undergraduate education and developing skills for tomorrow's workforce.

Key Benefits

- Test innovative desalination technologies on real waters
- Demonstrate operational feasibility of novel technologies in field settings
- Obtain data to refine techno-economic analyses and scale-up

Contact

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 wswalker2@utep.edu



DesaliNEWT 3kW, 2gpm Pilot System



Join Us!

Our Vision: Enable access to suitable water almost anywhere in the world by developing next-generation high-performance, easy-to-deploy drinking water and industrial wastewater treatment systems enabled by nanotechnology

Industrial Membership Program

In addition to fostering engagement with industry via testbed collaboration, NEWT also facilitates industry connections through its Industry/Practitioner Membership Program. The Program includes three membership tiers: **Full Member**, **Associate Member** and **Practitioner Member**. All members are entitled to the following benefits through NEWT:

- Industry/Practitioner Advisory Board participation
- Early access to NEWT research products such as reports, papers, and other publications
- Access to facilities and instrumentation utilized in NEWT research, subject to partner institution requirements, policies and regulations
- On-location short courses that may be provided by researchers per mutual agreement between the researchers and members
- Access to a NEWT Center knowledge base of research advances
- Opportunities to sponsor targeted NEWT/Member research projects at a reduced overhead rate
- Opportunities to commercialize NEWT intellectual property

NEWT is a unique resource for its Members, providing a collaborative environment whereby the research and market expertise of all Members can be leveraged to develop next-generation affordable, mobile, modular, high-performance water treatment systems enabled by nanotechnology.

Membership Annual Fees

Full Members (for profit companies):

≥ 500 Full-Time Employees	\$25,000 cash
50 – 499 Full Time Employees	\$15,000 cash
< 50 Full Time Employees	\$5,000 cash

Associate Members (for profit companies):

All Companies	\$8,000 cash & \$2,000 in-kind
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Practitioner Members (agencies, non-profits):

All Organizations	\$10,000 in-kind
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Contact

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