IUI Research infrastructure and instruments

Items indicated with the superscript (^{s}) indicate shared items, owned by the Institute and available for all. The use of some of those items involves a charge (see list at: http://www.iui-eilat.ac.il/SOS/Pricelist.aspx). Items marked with a superscript (^{p}) belong to single researchers, usually open for use through collaborations with the owner.

Buildings/rooms

- Library^{s} - holding a comprehensive reference collection of marine science with over 1000 books and electronic access to most periodicals via MALMAD (Israel Center for Digital Information Services), ULS (Union List of Serials in Israeli Libraries) and the ULE (Union List of EJournals).
- Visitor laboratories^{s}– equipped with ample bench space adjacent to a shared instrument laboratory in the teaching building.
- On-site dorms^{s} ("Dor House") - Eight rooms, furnished, air-conditioned, self-catering kitchens, and dining space. Maximum capacity 32 persons.
- Temperature-controlled rooms^{s} (two) – for cultures of bacteria and plankton
- Computer Room (22 desktop computers)^{s}
- Molecular biology laboratories^{s} – two labs for DNA separation and replication
- Meeting room^{s} - with video conferencing facilities; max capacity 12 persons
- Lecture room^{s} – with multimedia and video conference facilities; max capacity 50 persons.

General facilities

- Pier^{s}- a 40 m long pier equipped with two cranes, boat and ship-loading platform, and a sensor tower measuring a host of meteorological variables. The pier is also used as an entry point for divers and as an above-reef terminal for cabled in situ instruments.
- Dive center^{s} - highly professional dive center for regular air, Nitrox and Trimix dives, regular dives, technical dives, standard regulators and re-breathers. A high-pressure compressor, O_2/He gas blending system; 18 SCUBA sets, 3 sets of open circuit technical diving equipment and 4 re-breathers; 2 sets for underwater speech communication with full masks.
- Sea-water supply^{s} – a heavy-duty pumping system delivers 60 m^3/hr from 30 m depth
- Water tables^{s} – equipped with running sea water used for experiments with live corals and other marine animals.

Large research facilities

- Red Sea Simulator[p] (see figure below)- An array of 80 aquaria with running sea water and a robotic control of precise pH and temperature conditions. (For details see the above section on the IUI Research Centers.)
- Experimental seawater tanks[s]- two large, outdoor pools, 12 m^3 (4 m diameter, 1 m deep) and 38 m^3 (4 m diameter, 3 m high) in volume, allow experiments with large animals and/or use of large sensors.
- Underwater PIV[p] (see figure below) - A Particle Imaging Velocimeter systems to measure flow fields around objects and organisms at small scales (sub millimeter to centimeters).

Oceanographic and field facilities/equipment

- R/V *Sam Rothberg*[s] (see figure below)- A 16 m long research catamaran with twin engines allowing cruising speed of 10 knots. The ship is equipped with state-of-the-art oceanographic instruments and sensors, including a recording sonar, a navigation system, a 1 ton winch with 2 km conductive wire, CTD, a rosette with 11 Niskin bottles, sea-water pump, a water-filtration manifold, and a large winch with a long (>1 km) conductive cable.
- Boats - two 7 m long skiffs built to carry divers and light operations such as water sampling at single depths, plankton tows, mooring deployments, and more.
- Remotely Operated Vehicle (ROV)[s] (see figure below)- A vehicle for explorations and experiments in up to 300 m depth (scheduled to be upgraded to 1000 m). The ROV is equipped with a HD video camera, advanced navigation and logging system, and a manipulative arm for sampling and experiment deployments. It is operated from the R/V *Sam Rothberg* using a fiber-optics umbilical cable. The ROV, purchased jointly with EcoOcean, a non-profit organization operating in the Mediterranean Sea, will be operated half of the time in the Gulf of Eilat and half of the time in the Mediterranean Sea.
- ZOOPS-O[p]: An advance system for in situ zooplankton studies developed at Jules Jaffe's lab (Scripps Institute of Oceanography, UC San Diego, USA). The system consists of 4 sonars and 2 cameras to record simultaneous 3D images and acoustic targets at high rates (typically 1 Hz). The system can be used for autonomous profiling down to 500 m depth or on mooring using power & data cable (150 m long).
- MOCNESS – Multiple Opening-Closing Net and Environmental Sensing System for sampling zooplankton.
- Video Plankton Recorder[s]- towed by the ship, to carry long and fast out video transects of zooplankton at different depths.
- Plankton nets[s]- A set of single-mouth plankton nets
- TSK Flowmeters[s] - for plankton nets
- Light traps[s] – to trap zooplankton during the night
- Sediment grab[s]

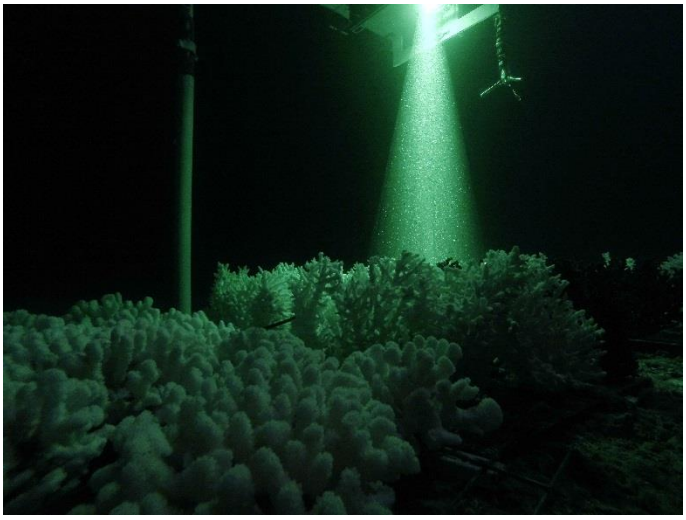
- Multi-corer (GOMEX)[s] - to obtain 4 sediment cores from soft bottoms at any depth.
- Piston corer[s] – to sample single sediment cores.
- Wave pressure gauge[s] (RBRsolo D & RBRsolo10k D | Depth Logger) – to record time series of wave heights and frequencies.
- Current meters[s] – Two Acoustic Doppler Current Profilers (ADCPs), two electromagnetic current meter (S4), and Aquadop current profiler
- Underwater cameras[s]
- Cabled underwater video cameras[s] – with cables to shore labs and u/w lighting system
- Underwater PAM[p] – to measure coral fluorescence
- Underwater spectral light meter[p]

Laboratory instruments

- Bench-top lab PIV[p]
- Advanced video cameras[p] – High-resolution fast (1500 fps) video cameras
- Flow-cytometer[p] to count phytoplankton, bacteria and viruses in sea water.
- Scanning microscope[p] for detection and ultrastructural analyses with high resolution.
- Unidirectional flume[P]
- Wave and unidirectional flume[P]
- FlowCam[s]- benchtop instrument to optically sort microzooplankton and phytoplankton in water samples.
- Culture incubator[s] – with temperature and light control
- Aquaria[s] - with running sea water
- Zooplankton sample sorting equipment[s] - microscopes, dissecting scopes, cameras, fiber optics light source, counting trays, fractionation nets, Stempel Pipettes, Utermoel Sedimentation Chamber[s]
- Calcimeter[s]
- Data logger[s] - Unisense
- Titration systems[s] - for Alkalinity, oxygen and pH
- Nutrient measuring instrument[s] - flow injection analyzer
- TOC[s]- to measure total particulate organic matter in sea water
- Water purification system[p] - Milli-Q® Integral Water Purification System for Ultrapure Water
- Iron measurement instrument[p] - Felume
- Gas chromatograph[p]
- PCR[s]
- Real-time PCR[s]
- Gel documentation system[s]

- Denaturing Gradient Gel Electrophoresis (DGGE)[s]
- Plate Reader[s] (Multiskan Spectrum)
- Water filtration system[s]
- Epifluorescence microscope[s]
- Dissecting microscopes[s] – 24
- Regular microscopes[s] – 24
- Confocal microscope[s] - Nikon
- Inverted microscope[s]
- Phase-contrast microscope[s]
- Standard lab facilities[s] – including autoclave, centrifuges, ventilation hoods, incubators, drying ovens, furnaces, shakers, baths, analytical and semi-analytical balances, refrigerators and deep freezers (-20 and -80^{o}C).
- Digital sensors[s] – for pH, oxygen and temperature
- Fluorometer[s] - Turner-Design
- Spectrophotometer[s]
- Scintillation counter[s]
- Rotating wheel[p] - for plankton experiments
- Freeze-drying lyophilizer[s]
- Sediment fractionation column[s] – 5 sieves with different standard mesh sizes and a shaker.
- PAM sensors[p] – to measure coral fluorescence, including standard PAM, Dual PAM, and PAM Microscope

The IUI Pier. The pier is used as a loading site of the Research Vessel and as a berthing site of the two IUI boats. It is heavily instrumented with weather sensors (seen on the tower near its seaward end) and cabled underwater instruments. The pier is also used as a site for the deployment of cabled instruments at the surrounding reef.



The underwater PIV system during in situ measurements of the effects of corals on small-scale currents over the reef. Owners: Profs. Uri Shavit (Technion) and Roi Holzman (IUI, TAU). Note the sheet of laser light projected onto the reef, where a horizontally-looking camera is deployed. The controlling system and data acquisition computer (not shown) are positioned on the pier ~8 m above the measured corals, ~3 m above sea surface. All underwater components are deployed inside custom-made water-tight housings with glass ports. (Photo credit: Yoav Lindemann)

Deployment of the Remotely Operated Vehicle (ROV) from R/V Sam Rothberg offshore the IUI. Note the ROV's manipulative arm, strobe and camera. The ship is an all-aluminum 16 m long, custom built vessel equipped with an A frame, a winch, and a set of standard hydrographic gear. (Photo credit: Yoav Lindemann)