

Rick Driscoll is working to generate renewable power from the Gulf Stream current.

## Sea currents could soon power Florida, FAU says

BY BRIAN BANDELL

Florida Atlantic University associate professor Rick Driscoll envisions Florida being mostly self-reliant for its energy needs by tapping into the sea.

He's not talking about offshore drilling or any other fossil fuel source. Rather, Driscoll is working with private industry and other universities to generate renewable power from the Gulf Stream current and the temperature difference in local waters.

"In 20 years, we could see an energy-independent Florida," Driscoll said. "Money that would leave the state would stay in the state."

Using submerged turbines to produce electricity - similar to how wind power works - could eliminate the need to build new coal-burning power plants in Florida and eventually handle the bulk of energy demand, he said.

In another project, cold water from the bottom of the ocean would be pumped to coastal areas to replace conventional air conditioning units.

FAU's Department of Ocean Engineering estimates that in its first 10 years, the project could generate more than 26,500 Florida-based jobs, including technical positions to design the system and blue-collar workers for construction, maintenance and operations. It would spur at least \$4 billion in local technology purchases in that time.

The Center of Excellence in Ocean Energy was established with a \$5 million grant from the state of Florida to pursue the endeavor. The project is based at FAU's SeaTech campus in Dania Beach.

It will cooperate with the nearby U.S. Navy research and heavy equipment center, Nova Southeastern University, the Harbor Branch Oceanographic Institution in Fort Pierce and the University of Central Florida. Industry partners include FPL Group in Juno Beach, Lockheed Martin and Ocean Renewable Power Co., of North Miami.

The ocean current project is the farthest along. The first commercial unit could be

in the water in three years, Driscoll said.

South Florida is one of the few places in the world where this idea makes sense. The Gulf Stream current off Florida is the fastest constant current in the world and averages only 12 miles off the coast. It moves 8.5 billion gallons of water a minute. At a speed of 5 knots, it generates power equivalent to a 55 mph wind.

The turbines would be placed on gliders and moored to the ocean floor at a depth of at least 50 meters. The electricity generated by the current turning the turbines would be channeled into an underwater line leading to a power plant, initially FPL's facility at Port Everglades.

Each of these turbine units could produce 3 megawatts of power, enough to supply a few thousand homes. It would take thousands of units to power South Florida, but Driscoll believes it would be easier and cheaper than building new coal or nuclear power plants.

"We don't take up a lot of land," he said. "It's offshore and out of site."

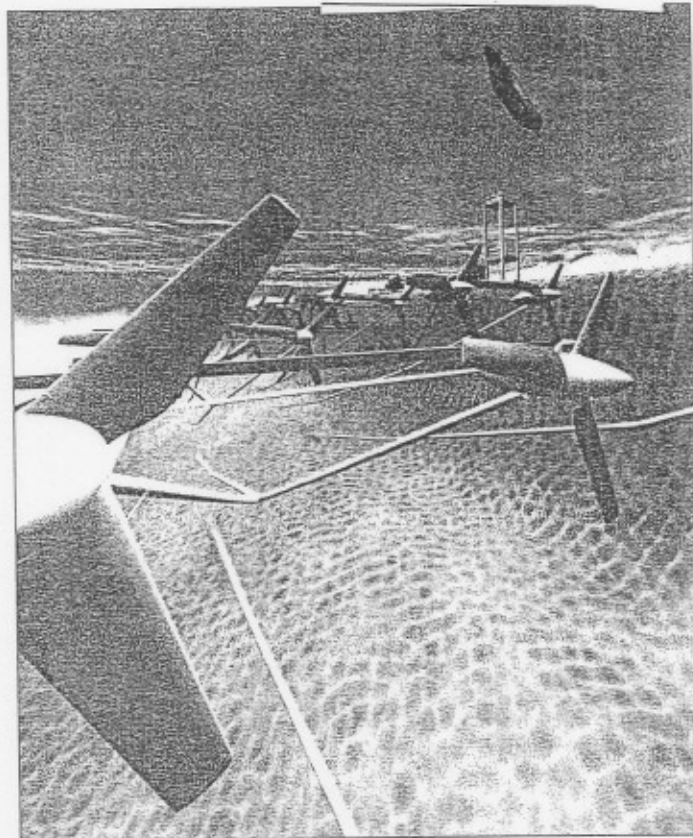
Unlike fossil fuel plants, ocean current power would produce no harmful byproducts and wouldn't contribute to global warming, Driscoll said.

NSU's Oceanographic Center will study the environmental impacts of the project, including its effect on marine life. The turbines will be moving slowly and have a beacon to warn dolphins, so Driscoll doesn't believe they will harm animals through impact.

The biggest challenges are finding the right composite material for the turbines to mitigate wear and corrosion, and designing a stable mooring system.

Projects like this have been tried before, but they all failed at the point where a turbine was to be placed in the water, Driscoll said. FAU is better positioned because it has many partners that are well equipped for the work. The Navy has \$500 million worth of equipment nearby and a permit

See POWER, next page



Turbines that produce electricity could eventually handle most energy demand.

## The state 'could be the Kuwait of ocean energy'

POWER, from previous page

for testing in the ocean off Dania Beach.

FAU is also working with private industry. Ocean Renewable Power Co. (ORPC) is one of several companies testing its current turbine design with FAU.

"Florida could be the Kuwait of ocean energy," ORPC President and CEO Christopher Sauer said. "There's just an abundance of it offshore. It is possible that it would negate the need for Florida to import energy from out of state."

The company has raised \$1 million in private funding and will apply for a grant of up to \$2.5 million annually for five years from the Florida Department of Environmental Protection for renewable energy projects.

### Prototype could come in 2008

If it gets state funding, the first commercial prototype would be in the water in late 2008 and commercial production could start as early as 2011, Sauer said.

ORPC is focusing on harvesting the Gulf Stream from the Keys through the Treasure Coast because that's where the current is close enough for underwater transmission cables, he said.

FAU is thinking long term about using turbines in the ocean currents thousands of miles offshore and converting the ener-

gy into hydrogen fuel that tankers would haul to land. UCF is leading the project's research on hydrogen fuel technology.

One day, the sea could supply the air conditioning for the coastal areas of South Florida through its natural temperature differences, Driscoll said.

Warmed by the Gulf Stream, the surface water off South Florida ranges from 75 degrees to 90 degrees, while the deep ocean water ranges from 38 degrees to 45 degrees. By pumping the warm surface water down to the cold water, a geothermal power plant can be created, Driscoll said.

Power from that plant could pump the cold water from the bottom of the ocean to the shore, where it would cool air conditioner units. Since the water warms up the farther inland it travels, this would only work several miles inland, Driscoll said. Still, it could be a cost-effective and self-sufficient way to supply the most densely developed area of Florida with air conditioning, which consumes half of energy costs in summer months, he said.

The technology is mostly available. A 30-year-old geothermal power plant is off the coast of Hawaii and newer technology is used in offshore oil production.

"The biggest challenge would be laying the pipeline onshore," Driscoll said.

E-MAIL STAFF WRITER Brian Bandell  
at bbandell@bizjournals.com.

# Biotech boom increases need for patent lawyers

SEA CURRENTS could soon power Florida, FAU says, SEE PAGE 8.

BY JULIA NEYMAN

Palm Beach County's biotechnology boom isn't just heating furnaces in the sciences arena.

The arrival of the Scripps Research Institute, coupled with an influx of start-up biotech companies and the movement of research universities into commercial ventures has created a burgeoning market for intellectual property law.

Large law firms like Akerman Senterfitt, which does most of Florida Atlantic University's (FAU) patent work and litigation, are beefing up their intellectual property practice groups in response to a jump in quantity and complexity of patents and trademarks coming out of South Florida.



Nelson

"We've seen an overall increase in patent litigation in the tri-county area," said Gregory Nelson, who heads Akerman Senterfitt's intellectual property practice group. "It's a trend that will continue - not only with our group, but with other firms in Florida - because the amount of intellectual property in the state is growing."

Akerman Senterfitt has expanded its West Palm Beach office from 30 to 40 attorneys in the past year, largely in response to increased demand for intellectual property law. Its intellectual property group is han-



FILE PHOTO

'Our needs in the next five years are going to increase significantly,' FAU's Larry Lemanski says.

dling between 15 and 20 law suits nationwide, said Jerry Schneider, an intellectual property litigator who joined the firm from Washington, D.C., a year ago.

The firm is handling several local cases, as well, including a patent infringement suit against Lake Worth-based Tire Seal International, which produces chemicals used in vehicle air-conditioning systems.

But Schneider said most intellectual property work is not centered on litigation, but on developing patent strategies, helping clients negotiate patent licenses

and figuring out what type of patent a client should proceed with.

FAU, one of the firm's largest clients, has created 25 patents in the last two and a half years through its Center of Excellence in Biomedical and Marine Biotechnology. The university's new Center of Excellence in Ocean Energy Technology, which was awarded state funding in November, will produce even more need for intellectual property counseling, said Larry Lemanski, FAU's VP for research.

Lemanski said FAU's partnership with the Scripps Research Institute has created an increased incentive to convert its research into public sector venture. FAU's first center of excellence spawned four start-up businesses, all of which require legal assistance with patent development, Lemanski said.

"Our needs in the next five years are going to very significantly increase, not only in the biomedical area, but also in the engineering area," he said. "We'll be expanding our need for legal advice and the patent attorneys we currently have."

Since intellectual property law hasn't traditionally been a focus in South Florida, some local tech companies rely on outside counsel. But that could change as more local law firms expand their intellectual property teams.

Dyadic International, a biotech firm that has been in Jupiter for 27 years, uses out-of-state lawyers to handle its patents. However, CEO Mark Emalfarb said several local law firms have offered Dyadic legal counsel in the last two or three years.

"In the past, there was no biotechnology

here, so why would a lawyer with biotech experience be located in South Florida?" Emalfarb queried. "But now that Scripps is coming, we're not only attracting bright scientists, but also intellectual property lawyers."

Emalfarb said that Scripps' arrival has made a "monumental difference" in the interest, funding and activity throughout the area's biotechnology sector. Lawyers are "one of the missing pieces of the puzzle" to expedite biotech expansion, he said.

The expansion can come from small boutique firms that specialize in intellectual property law, as well as large national firms that expand their South Florida offices or establish local intellectual property groups, Emalfarb said.

Adam Crall, who leads the patent practice area for Shutts & Bowen, said his firm has expanded its Tampa-based patent prosecution group in response to statewide biotech growth. He said that while biotech companies have had operations in South Florida before, the shift of upper management to the area provides the biggest incentive for local law firms to beef up their intellectual property practices.

"Intellectual property is critical to technology-based companies at the highest level, the strategy level," he said. "And we're seeing the brain centers and the muscle centers of very large pharmaceutical and biotechnology companies coming to Florida."

E-MAIL LAW WRITER Julia Neyman  
at [jneyman@bizjournals.com](mailto:jneyman@bizjournals.com).

# Largest Colleges and Universities

Ranked by 2006 fall enrollment

Rank 2006 2005	School Address	Phone Fax Web site	Fall Enrollment 2006 2005	Full-time Part-time students (%)	Full-time Part-time faculty (%)	Acceptance rate SAT score accepted	Median student age Financial aid (%)	Highest offered	Number of campuses Campus housing	Top local administrator Year founded locally
1	Miami Dade College 300 N.E. Second Ave. Miami 33132	(305) 237-8888 (305) 237-3109 www.mdcc.edu	83,080 89,637	22.8% 77.2%	WND	WND	27 WND	Bachelor's	8 No	Eduardo J. Padron 1960
2	Florida International University 11200 S.W. Eighth St. Miami 33199	(305) 348-2000 (305) 348-1908 www.fiu.edu	38,097 37,424	60% 40%	98% 2%	53% 1093	25 63%	Doctorate	4 Yes	Modesto A. Maidique 1965
3	Broward Community College 111 E. Las Olas Blvd. Fort Lauderdale 33301	(954) 201-7540 (954) 201-7577 www.broward.edu	34,781 36,570	32.2% 67.8%	28.6% 71.4%	Open admissions WND	23 31.4%	Associate	8 No	Larry A. Calderon 1959
4	Nova Southeastern University 3301 College Ave. Fort Lauderdale 33314	(954) 262-7300 (954) 262-3800 www.nova.edu	26,500 26,000	48% 52%	36% 64%	59% 1,010	31 95%	Doctorate	4 Yes	Ray Ferrero Jr. 1964
5	Palm Beach Community College 4200 Congress Ave. Lake Worth 33461	(561) 967-7222 (561) 868-3123 etnallm@pbccc.edu www.pbccc.edu	26,000 26,558	32% 68%	20% 80%	Open admissions WND	29 25%	Associate	4 No	Dennis P. Gallon 1933
6	Florida Atlantic University 777 Glades Road Boca Raton 33431	561-297-3020 561-297-3001 www.fau.edu	25,750 26,095	52% 48%	98% 2%	70% WND	25 41.6%	Doctorate	7 Yes	Frank T. Brogan 1964
7	University of Miami 1252 Memorial Drive Coral Gables 33124	305-284-2211 305-284-2507 www.miami.edu	15,670 15,874	91.4% 8.6%	82% 18%	40% 1220-1370	21 80%	Doctorate	5 Yes	Donna E. Shalala 1926
8	Keiser University 1500 N.W. 49th St. Fort Lauderdale 33309	(800) 749-4456 (954) 489-2974 www.keisercollege.edu	9,600 8,850	78% 22%	68% 32%	WND 1450	26 82%	Bachelor's	13 Yes	Arthur Keiser 1977
9	Barry University 11300 N.E. Second Ave. Miami Shores 33161	(305) 899-3000 (305) 899-2971 www.barry.edu	9,300 9,300	68% 32%	40.2% 59.8%	53.6% 974	30 80%	Doctorate	28 Yes	Sister Linda Bevilacqua 1940
10	Florida Career College 3383 N. State Road 7 Lauderdale Lakes 33319	(954) 535-8688 (954) 733-8220 www.flccollege.edu	3,864 2,461	100% 0%	65% 35%	WND	30 82%	Associate	5 No	David Knobel 1982
11	Palm Beach Atlantic University 901 S. Flagler Drive West Palm Beach 33416	(561) 803-2000 (561) 803-2991 www.pba.edu	3,264 3,171	87% 13%	58% 42%	86% 1087	44 95%	Pharm.D.	1 Yes	Joseph A. Kloba 1968
12	University of Phoenix 600 N. Pine Island Road, Suite 500 Plantation 33324	(954) 382-5303 (954) 382-5304 www.phoenix.edu/florida	2,604 2,217	100% 0%	90% 10%	WND	34 50%	Master's	4 No	Jamie Spellacy 1998
13	St. Thomas University 16401 N.W. 37th Ave. Miami Gardens 33054	(305) 625-6000 (305) 628-6591 www.stu.edu	2,517 2,407	47% 53%	47% 53%	50% 861	25 96%	Doctorate	1 Yes	Monsignor Franklyn M. Casale 1961
14	Lynn University 3601 N. Military Trail Boca Raton 33431	(561) 237-7000 (561) 237-7100 www.lynn.edu	2,281 2,300	89% 11%	92% 8%	71% 911	22 70%	Doctorate	1 Yes	Kevin M. Ross 1962
15	Johnson & Wales University 1701 N.E. 127th St. North Miami 33181	(305) 892-7000 (305) 892-7020 www.jwu.edu	2,200 2,400	95% 5%	70% 30%	80% 1200	22 85%	Bachelor's	1 Yes	Donald G. McGregor 1992
16	Florida National College 4425 W. 20th Ave. Hialeah 33012	(305) 821-3333 (305) 362-0595 www.fnc.edu	2,100 2,175	92% 8%	60% 40%	WND 838	27 97%	Associate	3 No	Jose Regueiro 1982
17	Florida Metropolitan University 225 N. Federal Highway Pompano Beach 33062	(954) 783-7339 (954) 943-2547 www.fmu.edu	1,957 1,532	49% 51%	23.2% 76.8%	70% WND	27 80%	Master's	10 No	Ilia Martin 1940
18	Miami International University of Art & Design 1501 Biscayne Blvd. Miami 33132 miuadmissions@aui.edu www.aiimu.edu	(800) 225-9023 (305) 374-7946	1,500 1,500	WND	WND	WND	WND	Master's	1 No	Erika Fleming 2002
19	American InterContinental University 2250 N. Commerce Parkway Weston 33326	(954) 446-6100 (954) 660-4073 www.aic.edu	1,220 1,954	100% 0%	42% 58%	100% NA	28 65%	Master's	1 No	Jim Vernon 1978
20	Lincoln College of Technology & Florida Culinary Institute* 2410 Metrocentre Blvd. West Palm Beach 33407 www.lincolncollegeoftechnology.com	(561) 842-8324 (561) 842-9503	1,200 1,200	100% 0%	70% 30%	WND	23 WND	Bachelor's	3 No	Charles Halliday 1982
21	Devry University 2300 S.W. 145th Ave. Miramar 33027	(954) 499-9700 www.devry.edu	1,177 1,177	41% 59%	NA	WND	28 WND	Master's	3 No	Julio Torres 1931
22	Carlos Albizu University 2173 N.W. 99th Ave. Miami 33172	(305) 593-1223 (305) 629-8052 www.mia.albizu.edu	1,070 1,050	67% 33%	27% 73%	97% WND	25 90%	Doctorate	1 No	Teresa Albizu-Rodriguez 1980
23	Northwood University 2600 N. Military Trail West Palm Beach 33409 ladmit@northwood.edu www.northwood.edu	(561) 478-5500 (561) 640-3328	1,000 1,000	90% 10%	40% 60%	WND 960	26 71%	Bachelor's	1 Yes	John Haynie 1984
24	Everglades University 5002 T. Rex Ave., Suite 100 Boca Raton 33431 www.evergladesuniversity.edu	(561) 812-1211 (561) 912-191	750 600	90% 10%	20% 80%	WND	WND 75%	Master's	3 No	Kristi Mollis 1990
25	National School of Technology 9020 S.W. 137th Ave. Miami 33186 dphoto@nsci.edu www.nsci.cc	(305) 386-9900 (305) 386-2531	600 770	85% 15%	80% 20%	WND	23 90%	Associate	4 No	Darrell Phtoen 1977

NOTES: South Florida refers to Miami-Dade, Broward and Palm Beach counties. NR - Not ranked. NA - Not available or applicable.  
\*Formerly the New England Institute of Technology at Palm Beach

Source: The schools.

Researched by James Elmer jeimer@bizjournals.com

# Largest MBA Programs

Ranked by 2006 MBA enrollment

Rank 2006 2005	School Address	Phone Fax Web site	MBA enrollment	MBA median student age	Types of MBAs offered	Tuition Tuition per credit	MBA program director
1	Nova Southeastern University 3301 College Ave. Fort Lauderdale 33314	(954) 262-7300 (954) 262-3800 www.nova.edu	2,782 2,037	34	MBA, MBA in entrepreneurship, MBA in finance, MBA in health service administration, MBA in real estate development	\$23,804-26,136 \$594 per credit	Randy Pohlman
2 3	Florida Atlantic University 777 Glades Road Boca Raton 33431	561-297-3020 561-297-3001 www.fau.edu	1,271 523	23-37	Accounting, crisis and emergency management, economics, environmental business management, finance, financial planning, forensic accounting, global entrepreneurship, international business, legal compliance, marketing, real estate, sport management, taxation and operations management	\$9,760-41,800 \$244-\$750 per credit	Mickey Maros
3 2	University of Miami 1252 Memorial Drive Coral Gables 33124	305-284-2211 305-284-2507 www.miami.edu	787 782	27-33	Traditional, executive, working professional & 1 year MBA programs	\$1,280 per credit	David Green
4 4	Florida International University 11200 S.W. Eighth St. Miami 33199	(305) 348-2000 (305) 348-1908 www.fiu.edu	485 467	30	Evening MBA, downtown MBA, international MBA, public manager MBA, professional MBA, executive MBA	\$238 per credit	Tomi Mandakovic
5 5	University of Phoenix 600 N. Pine Island Road, Suite 500 Plantation 33324	(954) 382-5303 (954) 382-5304 www.phoenix.edu/florida	406 370	34	Accounting, executive, global management, health care management, HR management, marketing, public administration, technology management	\$15,000-22,000 \$399 per credit	Rhonda Polak
6 10	Palm Beach Atlantic University 901 S. Flagler Drive West Palm Beach 33416	(561) 803-2000 (561) 803-2991 www.pba.edu	113 87	39	Concentrations in finance, international business, management and marketing	\$14,220 \$395 per credit	Edgar Langlois
7 14	Florida Metropolitan University 225 N. Federal Highway Pompano Beach 33062	(954) 783-7339 (954) 943-2547 www.fmu.edu	111 20	35	General management, international business, accounting, human resources, business administration	\$24,528 \$438 per credit	Austin Golding
8 6	Lynn University 3601 N. Military Trail Boca Raton 33431	(561) 237-7000 (561) 237-7100 www.lynn.edu	107 273	27	Administration, aviation management, mass communications and media management, hospitality management, financial valuation and investment management, international business, marketing, and sports & athletic management	\$12,600 \$525 per credit	Ralph Norcio
9 8	St. Thomas University 16401 N.W. 37th Ave. Miami Gardens 33054	(305) 625-6000 (305) 628-6591 www.stu.edu	106 99	30	Accounting, health management, international business, management and sports administration	\$625 per credit	Paul Maxwell
10 9	Barry University 11300 N.E. Second Ave. Miami Shores 33161	(305) 899-3000 (305) 899-2971 www.barry.edu	103 89	29	Accounting, finance, health services administration, international business, management, marketing and management information systems	\$725 per credit	Michael Broihahn
11 13	Carlos Albizu University 2173 N.W. 99th Ave. Miami 33172	(305) 593-1223 (305) 629-8052 www.mia.albizu.edu	90 36	31	MBA in organizational management, non-profit leadership or entrepreneurship	\$19,272 \$505 per credit	Maria Garcia
12 11	American InterContinental University 2250 N. Commerce Parkway Weston 33326	(954) 446-6100 (954) 660-4073 www.aiufl.edu	80 78	32	Healthcare management, management, accounting/finance, marketing, human resource management	\$25,312 \$527 per credit	Hisham Shaban
13 7	DeVry University 2300 S.W. 143rd Ave. Miramar 33027	(954) 499-9700 www.devry.edu	72 149	34	Business administration, accounting & financial management, human resource management, information systems management, project management, public administration and network & communications management	\$1,835 per course	WND
14 12	Everglades University 5002 T. Rex Ave., Suite 100 Boca Raton 33431	(561) 912-1211 (561) 912-1191 www.evergladesuniversity.edu	69 55	WND	Business administration	\$406 per credit	Christina Pelosky
15 NR	Keiser University 1500 N.W. 49th St. Fort Lauderdale 33309	(800) 749-4436 (954) 489-2974 www.keisercollege.edu	23 NA	30	Business administration, accounting, international business	\$5,600 (semester)	Lawrence K. Wang

NOTES: South Florida refers to Miami-Dade, Broward and Palm Beach counties. NR = Not ranked. NA = Not available or applicable.

Source: The school.

Researched by James Elmer jelmer@bizjournals.com