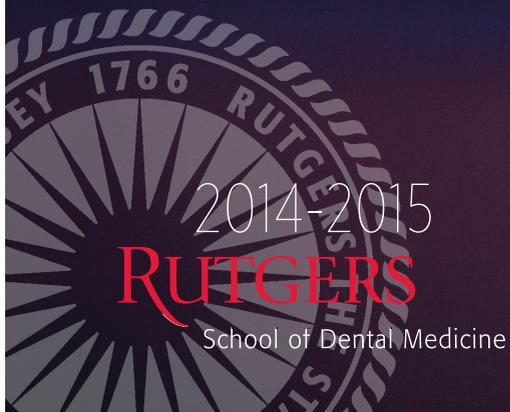


# REVOLUTIONARY

A tradition of breaking with tradition.



## Our Mission

The mission of Rutgers School of Dental Medicine is to improve oral health and quality of life through the education of oral health professionals and scientists, the conduct of research, the promotion of health and disease prevention, and the delivery of oral health care to communities throughout the state and beyond.



RUTGERS  
School  
Dental



# RUTGERS

School of  
Dental Medicine

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## A Message from the Dean



Within the history of dentistry and oral healthcare, RSDM has its own revolutionary tradition of breakthroughs, discoveries, and progressive ideas.

and they are values shared by our school.

Admittedly, when we think of America's fight to cast off the yoke of oppression, we don't think of oral health care. In the popular imagination, colonial dentistry was a time of brutish barber-surgeons yanking out the molars of agonized patients with a pair of rusty forceps. The scenario is portrayed in countless 18th-century satirical illustrations.

But dentistry's place in the history of the American Revolution is symbolic of how little the public knows about its evolution.

The patriotism of Paul Revere and his warning cry "The British are coming" are legendary. But you may be surprised to learn that Revere was an amateur dentist and a pioneer, of sorts, in the field of forensic dentistry. He identified the body of his war-hero friend Joseph Warren from Warren's dental remains.

George Washington's wooden dentures are part of our nation's folklore. But who knew they were made by John Greenwood, the son of Isaac Greenwood—the

nation's first American-born dentist? And, by the way, they weren't made of wood but a combination of ivory, animal teeth, and human teeth—and considered state of the art in their day.

Within the history of dentistry and oral health care, RSDM has its own revolutionary tradition of breakthroughs, discoveries, and progressive ideas.

No other dental school is doing the kind of innovative research that has become our hallmark. During fiscal year 2014–2015 our faculty garnered more than \$11 in federal funding for research that could change the way we treat diseases like leukemia and redefine medicine by ending reliance on antibiotics.

Our interdisciplinary post-graduate clinics, which we began constructing this year, represent a new wave in health care. Experts from every oral health care specialty will work together closely alongside clinical researchers to improve the lives of patients and educate future practitioners.

All are part of RSDM's mission to test new ideas, pursue big dreams, and draw from the strengths of yesterday to greet a bold and promising tomorrow.

Sincerely,  
*Cecile A. Feldman, DMD, MBA*  
**DEAN, RUTGERS SCHOOL  
OF DENTAL MEDICINE**

**I**T ISN'T AN OVERSTATEMENT to say that Rutgers University is determined to revolutionize health care and education in the United States. Its quest to merge the realms of research, patient care, and education as no other academic institution has done is enormous in both scope and ambition. And it is a challenge that Rutgers School of Dental Medicine (RSDM) has fully embraced.

Rutgers, The State University of New Jersey, was founded 10 years before the American Revolution, when the longing for freedom inspired visions of limitless possibility. Those values have shaped the Rutgers of today,



## A Message from the Chancellor

I AM DELIGHTED THAT RUTGERS School of Dental Medicine chose “revolutionary” as its theme this year. This is a great choice, given our nation’s need to transform health care and our desire, as Rutgers Biomedical and Health Sciences (RBHS), to be at the forefront of that transformation. And, of course, it is also the theme of the Rutgers 250th anniversary celebration.

The RBHS strategic plans contain initiatives that will be transformative and revolutionary. We are recruiting new faculty to realize our goals, which include groundbreaking research in infection and immunology, a field of study that has always been a priority at the School of Dental Medicine. RBHS is redefining our relationship with affiliate hospitals, including the University Hospital, where many dental school faculty and students provide care. We are also working on plans to increase patient access

to all our clinics and treatment facilities. Finally, we are developing a new multiprofessional practice plan, bridging the medical, dental, nursing, health-related, and pharmacy schools—and potentially additional schools.

I’m pleased that RSDM is our partner in these efforts, and I congratulate the school on establishing itself as a frontrunner in many aspects of health care and dental education, particularly

**RSDM research has resulted in a promising treatment for cancer and a method of destroying the drug-resistant pathogens that contribute to the death of nearly 2 million hospital patients a year. These ... discoveries transcend oral health care and are, indeed, revolutionary.**

biological research.

RSDM faculty members have produced innovative studies in harnessing the toxic power of bacteria to fight disease. Their research has resulted in a promising treatment for cancer and a method of destroying the drug-resistant pathogens that contribute to the death of nearly 2 million hospital patients a year. These and other discoveries transcend oral health care and are, indeed, revolutionary.

RSDM has distinguished itself as one of the most diverse dental schools in the nation, with its cutting-edge commitment to “holistic admissions.” This approach evaluates the entirety of students’ life experiences rather than focusing exclusively on grade-point average and other narrow criteria.

The school is a pioneer in using community-based service to teach tomorrow’s dentists. Its Community-Oriented Dental Education (CODE) program, which requires students to spend an extended amount of time treating underserved patients, is the first of its kind and a national model.

With contributions such as these, RSDM is helping Rutgers pave the way for a revolutionary new era in health care and learning.

Sincerely,  
*Brian L. Strom, MD, MPH*  
**CHANCELLOR, RUTGERS BIOMEDICAL  
AND HEALTH SCIENCES**





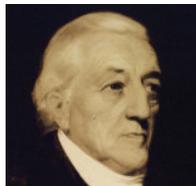


REVOLUTIONARY

# The Rutgers Revolution

What makes a school revolutionary? Innovative research, trendsetting academic programs, and pioneering efforts to support students as they strive to succeed.

**R**utgers University offers all these things—plus a past that predates America’s revolution. Founded in 1766, Rutgers is the only university in the United States that’s a colonial college, a land-grant institution, and a leading national public research university. First known as Queen’s College, it changed its name in 1825 to honor Revolutionary War hero Colonel Henry Rutgers. ■ With more than 65,000 students, Rutgers is ranked one of the top 100 universities in the world and one of the top 25 in the nation. It also stands as one of America’s largest, most comprehensive university-based centers for studying and improving human health and health care. In 2013, Rutgers integrated with the University of Medicine and Dentistry of New Jersey (UMDNJ) to form Rutgers Biomedical and Health Sciences (RBHS), which includes eight medical and health-related schools and entities such as the Rutgers Cancer Institute of New Jersey. RBHS receives 1.7 million patient visits annually and is home to more than 350 supported clinical trials at any given time. ■ At Rutgers School of Dental Medicine, we share the university’s legacy of revolutionary goals and accomplishments. Since our founding in 1954, we have reimagined the way research is conducted, students are educated, and patients are treated. ■ During this fiscal year we have seen our faculty receive more than \$11 million



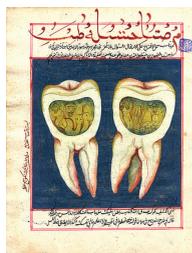
# 1766

was the year that Queen’s College was founded. In 1825, it became Rutgers University, named for Revolutionary War hero Colonel Henry Rutgers.

## Milestones in Dentistry

### 5000 BC

A Sumerian text describes “tooth worms” as the cause of dental decay. Belief in tooth worms persists through the Middle Ages until their existence is debunked.



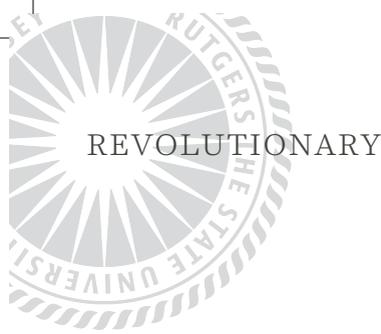
### 3000 BC

In one of the earliest known examples of cosmetic dentistry, women in the African nation of Mali sport filed, pointed teeth apparently as a mark of beauty, according to archeologists who examine their remains.



### 2600 BC

Death of Hesy-Ra, an Egyptian scribe often called the first “dentist.” An inscription on his tomb reads, “the greatest of those who deal with teeth, and of physicians.” This is the earliest known reference to a person identified as a dental practitioner.



"I'm looking forward to exchanging ideas, joining together on research, and benefiting from the advice of my colleagues at other Big Ten schools."

— CECILE A. FELDMAN, DEAN, RSDM

in research dollars. We have instituted programs that are among the first of their kind and further developed initiatives that are at the forefront of oral health care. Since the 2013 integration, we now have the seamless ability to work with other Rutgers schools on research, patient care and education. As part of Rutgers University, we are proud to continue a tradition of breaking with tradition.

### REVOLUTIONARY MOMENTS AT RUTGERS

Some of Rutgers' earliest students were, quite literally, revolutionaries. In 1776 several went off to fight the Redcoats in the War of Independence, inspired by university tutor John Taylor, who joined the Revolutionary Army.

Less than a decade later, Rutgers students were paving the way for the start of collegiate journalism. *The Political Intelligencer and New Jersey Adviser*, said to be the first newspaper published under the auspices of an American college, began publication in 1783.

In 1869 Rutgers gave birth to college football when the first intercollegiate game was played in New Brunswick against Princeton University. (Rutgers won, 6–4.) Fifty years later, one of the Scarlet Knights' star players was legendary actor and athlete Paul Robeson, the third African-American student in Rutgers' history. Robeson gave the valedictorian address at commencement that year and went on to become a Civil Rights activist, hailed for being far ahead of his time.

A banner year for Rutgers scientists was 1952, when Professor Selman Waksman won the Nobel Prize in Medicine for research that led to the discovery of strepto-

mycin—the first antibiotic effective against tuberculosis.

In 1961, Rutgers became the first training site for volunteers with the newly created Peace Corps.

Rutgers has also made landmark contributions to the arts. It's known as the birth place of the seminal Fluxus artistic movement of the late 1950s. In 2008 Rutgers alumnus Junot Diaz, the nation's first major Dominican-American writer, won the Pulitzer Prize for Fiction for his novel *The Brief Wondrous Life of Oscar Wao*. (The title character is also a Rutgers alum.)

Last year's Pulitzer Prize for Poetry went to Gregory Pardlo, a 1999 graduate of Rutgers University–Camden, who won for his collection of poems, titled *Digest*.

### TOP TEN

The Big Ten is known for its football teams, and although fans don't fill bleachers for root canals, it also includes nine dental schools.

In 2014, Rutgers, along with the University of Maryland School of Dentistry, became the first dental school to join the Big Ten in four years. The others schools are at Indiana University, the University of Iowa, the University of Michigan, the University of Nebraska, the University of Illinois and Ohio State University.

What do Big Ten schools have in common? Most are large state flagship research universities. They also belong to the Committee on Institutional Cooperation—the academic arm of the Big Ten athletic conference. Collectively, Big Ten researchers receive annual funding of more than \$9 billion.

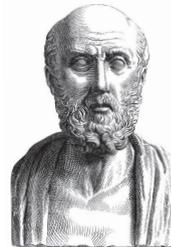
## Milestones in Dentistry

### 1700–1550 BC

An Egyptian text, *Ebers Papyrus*, refers to diseases of the teeth and various toothache remedies.

### 543 BC

Before Buddha's body is burned on a pyre, a disciple extracts his tooth and places it in a Sri Lankan shrine known as the Temple of the Tooth.



### 500–300 BC

Hippocrates and Aristotle write about dentistry, including the eruption pattern of teeth, treating dental decay and gum disease, and extracting teeth with forceps.

### 400 BC

The Phoenicians create artificial teeth to replace missing incisors and bind them to neighboring teeth with gold wire.

### 100 BC

Celsus, a Roman known for his compendium of medical writing, includes information on oral hygiene, stabilization of loose teeth, and treatments for toothaches.



## RSDM History

The transition from a private to a public university is a unique path for a dental school.

# 1954

RSDM IS FOUNDED AS THE SETON HALL COLLEGE OF MEDICINE AND DENTISTRY. FIRST CLASS MATRICULATES IN 1956.

# 1960

FIRST CLASS GRADUATES (35 MEN, ONE WOMAN)

# 1981

STATE LEGISLATURE GRANTS UNIVERSITY STATUS

# 2013

UMDNJ JOINS RUTGERS UNIVERSITY

### AD 166-201

The Etruscans practice dental prosthetics using gold crowns and fixed bridgework.



### AD 250

Apollonia, the patron saint of dentists, is canonized. She is often portrayed holding forceps that clasp an extracted molar.

### AD 400

The Mayans place carved stone inlays, including jade and turquoise, into cavities for spiritual and ornamental purposes.



### AD 570

The Prophet Muhammad introduces oral hygiene to the Muslim world by incorporating it into Islam. According to the Koran, ritual ablutions include rinsing the mouth 15 times a day.

### AD 700

A medical text in China mentions the use of "silver paste," a type of amalgam.





REVOLUTIONARY

# Students at the Forefront

We seek students with unexpected insights, drawn from life experience, ready to master traditional skills and the latest techniques.

At Rutgers School of Dental Medicine we value students who aren't content with the status quo, who believe that transforming healthcare—and the world—can only happen when we respect each others' humanity, individuality, and well-being. ■ We reject the sink-or-swim mentality of yesteryear's approach to dental education and work hard to foster a climate of trust, inclusion, and support. At the same time, our commitment to clinical and academic excellence is unwavering. ■ RSDM has created unprecedented programs that support students in the classroom, the clinic, and beyond; some have become national models. We are constantly searching for new ways to prepare our students for a world with evolving technology and patients whose cultures may differ from their own. ■ Our competency-based curriculum—which requires students to complete a comprehensive array of procedures, from fillings to implants, before they're proficient—bucks the trend toward less rigorous expectations. As a result, more than 95 percent of our students pass their National Board Exams on the first try. ■ The strength of our curriculum also explains why our match rate for the Class of 2015 was 83 percent, compared with the national average of 65 percent. "We have such a strong clinical program that our reputation precedes us," says Kim Fenesy, senior associate dean for academic affairs. "In our surveys of postgraduate residency



# 95%

Our competency-based curriculum bucks the trend toward less rigorous expectations. As a result, more than 95 percent of our students pass their National Board Exams on the first try.

## Milestones in Dentistry

**1210**

A guild of barbers is established in France, eventually dividing into two groups: surgeons, who are educated and trained to perform complex operations, and lay barbers, or barber-surgeons, who perform more routine hygienic services, including shaving, bleeding, and tooth extraction.



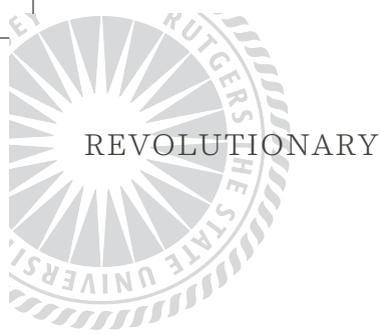
**1400**

A series of royal decrees in France prohibits lay barbers from practicing all surgical procedures except bleeding, cupping, leeching, and extracting teeth.

**1450**

Incans were familiar with oral hygiene and filling materials. Skulls have been found that show how seashells, carved into the shape of incisors, replaced missing teeth.





RSDM is among the most diverse dental schools in the United States, and this past year we reached a milestone. The Class of 2018 is the most diverse in our history. Sixty percent are minorities, including 10 percent African American and 20 percent Hispanic.

directors, we always get high marks for the level of our students' clinical skills."

RSDM is also ahead of the curve when it comes to training educators. Keenly aware of the shortage of dental academic instructors, we have developed a unique program that trains general and pediatric dentists to teach. The program, called From Practice to Preceptor, began in 2012 with \$2.5 million in federal funding. So far it has enabled us to help dozens of professionals become first-rate instructors and administrators.

When it comes to pre-dental education, RSDM is a true pioneer. In 2000 we became the first dental school in the U. S. to offer a pre-dental immersion program that exposes college students to the daily life of dental school. Called Gateway to Dentistry, the two-week, hands-on experience teaches basic skills such as waxing and making impressions. It also helps students realize that dentistry is multidimensional and can include careers in research, clinical specialties, and forensic work.

We know that, ultimately, we succeed because of the caliber and character of our students, and that's why we're so selective. Of the 1,844 applicants to RSDM in fall 2014, we admitted just 91.

We are proud to say that RSDM is among the most diverse dental schools in the United States, and this past year we reached a milestone. The Class of 2018 is the most diverse in our history. Sixty percent are minorities. We also have many non-traditional students who are pursuing dentistry as their second career. Others are enrolled in our Internationally Trained DMD program, which enables qualified dentists educated outside the U.S. or Canada to

earn a degree that will allow them to acquire a license to practice in the U.S.

The numbers convey our dedication to holistic admissions.

### HOUSE AND HOME

The concept of "houses" to foster a sense of camaraderie and support has been popular in medical school for several years, but RSDM decided to introduce it to dental school students in 2013.

Dr. Herminio Perez, director of Student and Multi-cultural Affairs at RSDM, calls the houses "learning communities," a concept that took hold 40 years ago to help students with similar goals and missions learn and socialize together.

Few, if any, dental schools have a similar program.

The RSDM houses organize members into four groups, each with a mix of first- through fourth-year students. The houses, which represent the four elements—water, fire, earth, and air—aren't located in a specific place but function more like teams.

Together, members study certain required academic modules, such as Gross Anatomy and Intro to the Dental Profession, and are scheduled for the same clinical rounds.

A major goal of the program is to help ease the anxiety and isolation that can result from adjusting to dental school, says Perez.

"There is a process of adaptation, and many don't know how to cope," he explains. "An important part of the houses is to promote wellness, for students to feel like there's someone who can look out for them and help them."

## Milestones in Dentistry

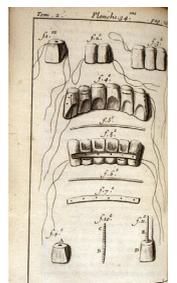


**1530**  
The first book devoted entirely to dentistry, *The Little Medicinal Book for All Kinds of Diseases and Infirmities of the Teeth* (known in German as *Artzney Buchlein*), is published in Germany. Written for barbers and surgeons who treat the mouth, it covers practical topics such as oral hygiene, drilling teeth, and placement of gold fillings.

**1575**  
Frenchman Ambroise Paré, known as the "father of surgery," publishes his *Collected Works*, which includes information on tooth extraction and the treatment of tooth decay and jaw fractures.



**1723**  
Pierre Fauchard, a French surgeon, publishes *The Surgeon Dentist, or a Treatise on Teeth* and eventually becomes known as the "father of modern dentistry." His book is the first to describe a comprehensive system for the practice of dentistry, including basic oral anatomy, operative and restorative techniques, and denture construction.





“The houses have allowed us to build professional relationships that are critical to navigate dental school with success. I can say that the most helpful advice I’ve received has come directly from my peers in the classes above me.”

— MARY THOMPSON  
SECOND-YEAR STUDENT

Students wear tees with an emblem from each “house”.

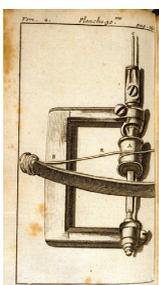
### UNDER THE RAINBOW

They came from campuses filled with Pride Weeks, rainbow flags, and LGBTQ (lesbian, gay, bisexual, transgender, queer) clubs and organizations.

But until three years ago at RSDM, there were no LGBTQ groups and some students had to readjust. At dental schools nationwide, such organizations are a rarity.

“It was different than what we had at college, where it was a very supportive setting, and here there was no representation,” says third-year student Joseph Zaino.

That changed in 2012, when alumnus Christopher Disla, Class of 2013, founded the school’s Dental Association for Equality. A group of LGBTQ students and allies, it has since grown to a membership of 40. Although a handful of dental



**1746**

Claude Mouton describes a gold crown and post to be retained in the root canal. He recommends white enameling on gold crowns for a more aesthetic appearance.

**1760**

John Baker, earliest medically trained dentist, emigrates from England and sets up practice in America.

**1760-1780**

Isaac Greenwood practices as the first native-born American dentist. His son, John, also a dentist, goes on to make dentures for George Washington using gold wire, steel springs, and ivory.



**1768-1770**

Paul Revere places advertisements in a Boston newspaper offering his services as a dentist. In 1776, in the first known case of post-mortem dental forensics, Revere verifies the death of his friend Dr. Joseph Warren when he identifies the dental bridge that he constructed.



# REVOLUTIONARY

“I think for first-year students it’s harder and there can be some struggling. I’ve always been accepted at RSDM, but it’s nice to have a supportive presence on campus making sure that people are aware that this is a safe space, that it’s OK to express yourself.”

— JOSEPH ZAINO, THIRD-YEAR STUDENT

schools now have LGBTQ groups—and there seems to be a burgeoning movement—the trend is still new.

Dental school can be grueling, with little downtime for a social life, especially for newcomers, says Zaino, the current president of the group. Since it began, the association has held a fundraiser for a New York City shelter for homeless LGBTQ youth. Members say they will also begin outreach to LGBTQ residents in Newark.

### LASERING IN

This year RSDM became one of the first dental schools in the country to introduce digital laser technology

for periodontal surgery as part of its curriculum.

It’s a tool that negates the need for scalpels and stitches. “Patients are thrilled with it,” says Dr. Andrew Sullivan, interim chair of Periodontics, who completed a professional training course in the new method. Sullivan and other faculty members have learned to use Millennium Technologies’ PerioLase MVP-7 to perform surgery on patients with periodontitis.

The surgical laser procedure, called LANAP, spares patients nearly all the pain and bleeding that accompanies traditional surgery on infected gums.

In nonlaser periodontal surgery, an incision is made in



Joseph Zaino, president of Dental Association for Equality.



Fourth-year student Edward Dominguez, left, enjoys mentoring first-year students, like Michael Israel, right, in the clinic.

## Milestones in Dentistry

1780

Tooth transplants become fashionable in France, where the poor sell their extracted teeth to the rich. Other teeth are extracted from corpses. The practice ends shortly afterward, in part due to the transmission of diseases, including syphilis.

1781

Dentists attained positions of respect and prestige in European courts. London’s most fashionable dentist, Charles Francoise Dumergue, was Dentist to the Royal Family. His official title was “Court Operator of the Teeth.” He was also dentist to the Prince of Wales from 1785 until 1814.



1788

German settlers in Pennsylvania adapt a Native American remedy: heating bark from a prickly ash tree and applying it to sore teeth. They call the prickly ash “the toothache tree.”

the gums so that tartar can be scraped from the roots of the tooth and bone can be reshaped. Afterward, the gums are sutured. The procedure can be painful and recovery is often slow.

LANAP works by lasering away the infected tissue before heat seals the gums with a thermal blood clot, creating a barrier between the bacteria and tissue. Recovery is fast and relatively pain-free.

While LANAP doesn't negate the need for students to learn traditional methods of periodontal surgery, it gives them a competitive advantage as practitioners, says Sullivan. "It's not a replacement, but it's another tool. It's important for our students to graduate on the leading edge, having been trained in the most advanced, evidence-based treatments available."

#### OFFERING ASSISTANCE

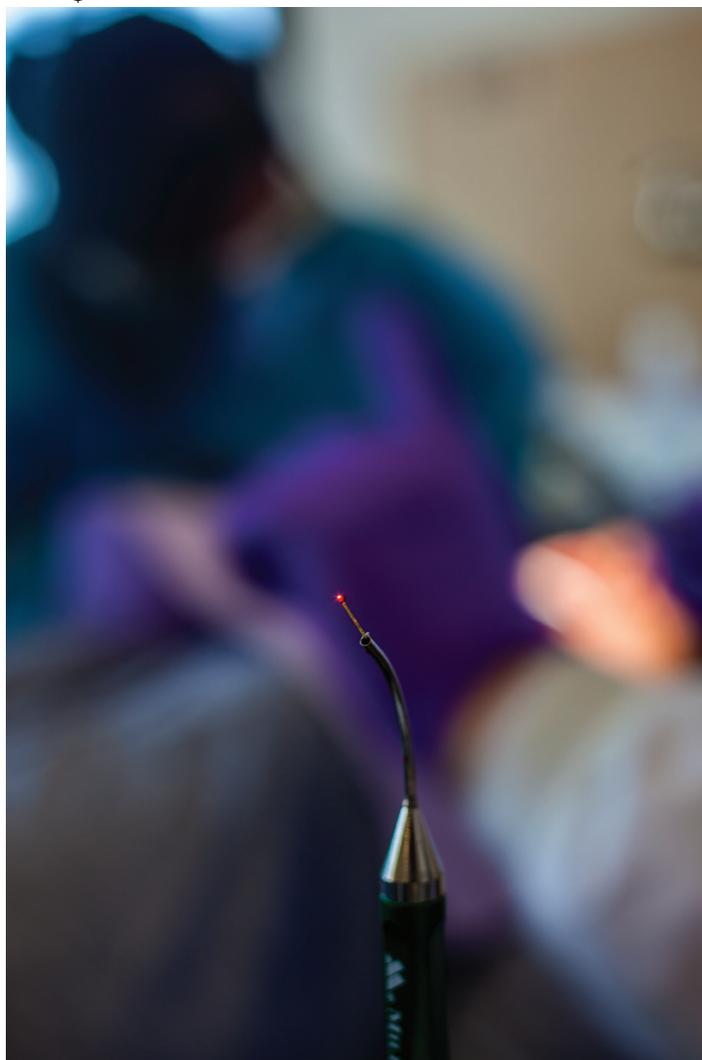
Until this academic year, when third-year RSDM students were ready to treat patients, they had never before worked in the clinics. There was a vast, and sometimes overwhelming, amount of things to learn.

In addition to developing their chairside manner, students had to adjust to unfamiliar routines.

To ease the transition, RSDM introduced a program that lets students acclimate themselves by assisting in the clinic during their first year rather than wait until their third year, when they begin to treat patients.

Over time, students can learn the clinic's protocols and routines and observe the best ways of interacting with patients.

It's also an opportunity for the academic lessons of den-



RSDM students learn laser periodontal surgical techniques.

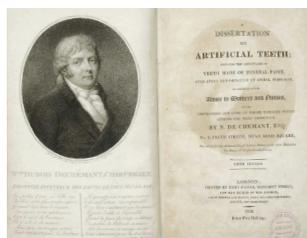
tal school to be applied in real life and for students to make connections between the two.

"You learn things like using the air/water syringe, how to set up a tray for impressions, and basic cleanings," says first-year student Michael Israel.

Third- and fourth-year students, like Edward Dominguez, an international student who practiced in the Dominican Republic before enrolling at RSDM, also benefit. "It's really nice to be able to share your knowledge," he says.

1789

Frenchman Nicolas Dubois de Chémant receives the first patent for porcelain teeth.



1790

John Greenwood, son of Isaac Greenwood, constructs the first known "dental foot engine" by adapting his mother's foot-treadle spinning wheel to rotate a drill. That same year, Josiah Flagg, a prominent



American dentist, constructs the first chair made specifically for dental patients. He does so by attaching an adjustable headrest, plus an arm extension to hold instruments, to a wooden Windsor chair.



# Pioneering Patient Care

RSDM is determined to find the best and latest ways to treat patients, whether that means applying cutting-edge findings from our research or building state-of-the-art facilities that serve unmet needs.

**I**n 2014 we logged 123,000 patient visits to our general dentistry and specialty clinics. We also moved closer to realizing our visionary plans for a postgraduate interdisciplinary clinic that will foster collaboration among specialists and researchers to a degree that's rare at dental schools. Construction began in 2014. ■ Last year we opened an upgraded version of our clinic for patients with disabilities, which remains the only one of its kind in the region. The Delta Dental of New Jersey Special Care Center treats patients with a wide range of disabilities, from autism and cerebral palsy to mental disorders. It also serves geriatric patients. ■ In recent years the special-needs population has dramatically increased, but there is a shortage of dentists who are properly trained to treat these patients. RSDM, which treats more than 4,000 special-needs patients annually, has been a leader in the field. Our curriculum requires all students to do a rotation in the special-needs clinic so that, whether general practitioners or specialists, they'll have some experience treating patients with disabilities. ■ Last year we also opened our Brunsdon-Villa Pediatric Dental Center, which is equipped with the latest in technology and offers patients a bright, stylish new waiting room. In 2014 it received more than 7,400 visits. ■ Our Center for Temporomandibular



**4,000** RSDM treats more than 4,000 special-needs patients annually. All students do a required rotation in the special-needs clinic and have experience treating patients with disabilities.

## Milestones in Dentistry

**1801**  
Richard C. Skinner writes *A Treatise on the Human Teeth*, the first dental book published in the United States. Skinner concisely explains the tooth structure and cause of disease and decay.



**1825**  
Samuel Stockton White begins commercial manufacture of porcelain teeth. His S.S. White Dental Manufacturing Company is established, and it dominates the dental supply market throughout the 19th century.



**1832**  
James Snell invents the first reclining dental chair.

**1833**  
The Crawcours, two brothers from France, introduce amalgam filling material in the United States. They are later exposed as charlatans whose unscrupulous methods spark the "amalgam wars," a bitter controversy within the dental profession over the use of amalgam fillings.



“Normally, we will have to remake this kind of prosthesis for the patient throughout their life, but if it’s made digitally, they don’t have to go through the original process again. We could just press ‘print’ on the computer and churn out another one.”

— DR. LOUIS DIPEDE



“Dr. Heir asked a lot of questions. Other people weren’t listening. But it was like he knew me. He knew the pain; he knew where it was coming from. He understood.”

— JERRY WILLIAMSON, PATIENT

Disorders and Orofacial Pain boasts internationally renowned faculty who have made groundbreaking strides in treating complex, difficult cases involving migraines, temporomandibular joint disease, and other types of chronic pain.

### BIG RELIEF

For more than half his life, Jerry Williamson endured excruciating pain in his right jaw that was repeatedly misdiagnosed as a dental issue.

It began in junior high—after he got braces—and persisted into his 40s despite tooth extractions, root canals, and oral surgery. “Sometimes it felt like, instead of a molar in the back of my mouth, I had a nail there,” describes Williamson. “It’s hard to focus when you’re in pain. I’d forget things. I was moody.”

Last year he was referred to Dr. Gary Heir, who directs the center’s Division of Orofacial Pain. He diagnosed Williamson with post-traumatic trigeminal neuralgia, a chronic pain condition that follows initial trauma.

In Williamson’s case, it probably began as complications from orthodontia and eventually began to fray his nervous system, a condition which was likely exacerbated by unnecessary dental and surgical procedures.

For Heir, Williamson’s case was typical. His patients who live with chronic pain have often received multiple misdiagnoses before they find him. Often, the failed treatments only make things worse.

From his first appointment with Heir, Williamson felt as though he’d come to the right place. “Dr. Heir

asked a lot of questions. Other people weren’t listening. But it was like he knew me. He knew the pain; he knew where it was coming from. He understood,” notes Williamson. “It was the opposite of what I getting with other doctors.”

Heir prescribed a treatment developed through research at the center: a mouthpiece that delivers a topical combination of medications to the site of Williamson’s nerve injury.

This groundbreaking form of treatment finally eliminated Williamson’s pain. Although he still experiences small flare-ups, his pain level has decreased from nine, at its worst, to one.

“Since I started seeing Dr. Heir, it’s been the best three months I can remember,” he declares.

### BUILDING A BETTER PROSTHESIS

When patients lose their upper jaw to oral cancer, they can’t eat, drink, or speak.

“That’s because you’re missing the separation between your mouth and nose,” explains Dr. Louis DiPede, director of RSDM’s Postgraduate Prosthodontics program.

The solution is an obturator prosthesis, which replaces the roof of the mouth.

For a custom fit, it must be molded by hand so that it’s thin yet strong enough to fit into the mouth without moving too much or becoming an impediment.

But the acrylic material that’s normally used to make this kind of prosthesis isn’t always ideal. “It’s the material of choice because you can add to it and subtract from it,”

## Milestones in Dentistry

1839

Charles Goodyear invents the process for hardening rubber vulcanite, an inexpensive material easily molded to the mouth. It makes an excellent base for false teeth and is soon adopted for use by dentists.

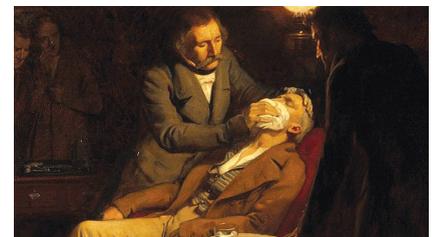


1840

Horace Hayden and Chapin Harris found the world’s first dental school, Baltimore College of Dental Surgery, and establish the doctor of dental surgery (DDS) degree. The school merges with the University of Maryland in 1923.

1846

Dentist William T.G. Morton conducts the first successful public demonstration of the use of ether as an anesthetic for surgery. (Painting by Ernest Board, ca. 1920)





Dr. Gary Heir and Jerry Williamson



**1850's**

Well-to-do Victorians bring their own set of dental scalers to the dentist. It was a status symbol, even though most sets were fairly plain with ivory or bone handles. Prince Albert's (right) set was designed to match his wife's, Queen Victoria, with mother-of-pearl handles and gold fittings.



**1855**

Robert Arthur originates the cohesive gold foil method, which allows dentists to insert gold into a cavity with minimal pressure.

**1859**

Twenty-six dentists meet in Niagara Falls, New York and form the American Dental Association.

**1864**

Sanford C. Barnum develops the rubber dam, a piece of elastic rubber fitted over a tooth by means of weights. Convinced by his uncle to give his invention to the profession as a gift, Barnum was presented with testimonials as tokens of appreciation throughout his life.



This year, Daniel H. Fine, chair of RSDM's oral biology department, won \$3.2 million in funding from the National

says DiPede. "But it's not always lightweight enough for the best fit."

When DiPede was searching for a material that was both strong and light enough to make the best obturator prosthesis, he realized titanium would be perfect. But because it isn't malleable, it would require exact measurements with no margin for error or adjustment.

To that end, DiPede is working on a plan to use technology that involves computer-aided design and computer-aided manufacturing (CAD/CAM) to create the first obturator prosthesis from titanium. He plans to partner with a dental lab, which will mill the material.

Although RSDM has been using CAD/CAM for nearly a decade, it's typically reserved for crowns and bridges, not artificial palates.

"I can take the CAD/CAM technology used for other dental prostheses and apply it to the maxillofacial prosthetic realm," explains DiPede.

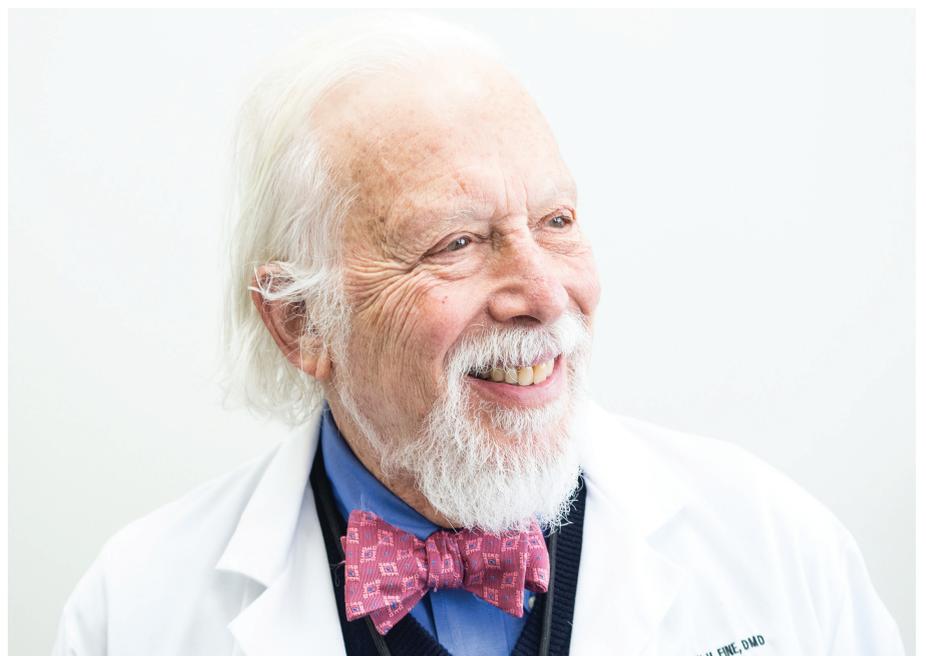
If his experiment succeeds, and he thinks it will, the result will be a more durable, better-fitting device.

"Normally, the maxillofacial prosthodontist will have to remake this kind of prosthesis for the

patient throughout their life, but if it's made digitally, they don't have to go through the original process again. We could just press 'print' on the computer and churn out another one," says DiPede.

**NEW KNOWLEDGE, NEW TREATMENTS**

Thomy Elusme, 20, who grew up in a Haitian orphanage, brushed his teeth every day but started suffering



Dr. Daniel Fine

Milestones in Dentistry

**1866**  
Lucy Beaman Hobbs graduates from Ohio College of Dental Surgery, becoming the first woman to earn a dental degree.

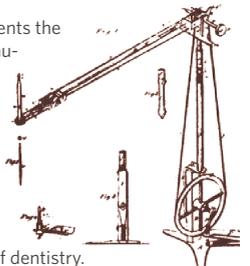


**1867**  
Harvard University Dental School, the first university-affiliated dental institution, is founded.



**1869**  
Dr. Robert Tanner Freeman becomes the first African-American man to earn a dental degree. He was accepted by Harvard Medical School at the age of 21, after a petition by Dean Nathan Cooley Keep to end the school's exclusion of African Americans and other racial minorities.

**1871**  
James B. Morrison patents the first commercially manufactured foot-treadle dental engine. His inexpensive mechanized tool provides dental burs enough speed to cut enamel and dentin smoothly and quickly, revolutionizing the practice of dentistry.



Institutes of Health to study the causes and prevention of LAP, which affects up to 2 percent of African-American youths.

from loose teeth in his teens. He was diagnosed with local aggressive periodontitis (LAP), a rare gum disease that strikes African-American adolescents.

At RSDM, faculty and researchers now have the ability to use cutting-edge research to help patients like Elusme. This year, Daniel H. Fine, chair of RSDM's oral biology department, won \$3.2 million in funding from the National Institutes of Health to study the causes and

prevention of LAP, which affects up to 2 percent of African-American youths. A disease that's rooted in genetics, it causes loose teeth and bone decay.

Elusme was referred to RSDM adjunct faculty member Thomas Bissell, a periodontist, who is treating him pro bono at his private practice. Bissell brought him to RSDM for diagnostic tests to learn more about how the disease had affected Elusme.

Initial results revealed that his mouth harbors an especially potent form of the bacteria Fine blames for LAP, which helped guide Elusme's treatment.

Fine hopes to some day use his research to prevent patients like Elusme from suffering from the progression of LAP. His findings increase the possibility that in the future the disease could be pinpointed through a quick saliva test, administered by a school nurse before it causes damage.

"The nurse might be able to give them something right then and there so they can prevent the disease from occurring," says Fine. "That's our hope."



Dr. Daniel Fine and LAP patient Thomy Elusme

### 1880s

The collapsible metal tube paves the way for toothpaste to be mass-produced and mass-marketed. Previously, it was available in powder and liquid form only and sold in boxes and bottles.



### 1885

The first female dental assistant is employed by C. Edmund Kells, a prominent New Orleans dentist. Her duties included chairside assistance, instrument cleaning, inventory, appointments, book-keeping, and reception.



Soon "Lady in Attendance" signs are routinely seen in the windows of 19th century dental offices. At right, Kells and his "working unit." The assistant on the left is keeping cold air on a cavity, while the others mix materials and take notes.



RSDM graduate Steve Milord examines children as part of an annual dental mission that allows students and faculty to establish a rural clinic along the border of the Dominican Republic and Haiti so that patients in both nations can be served.

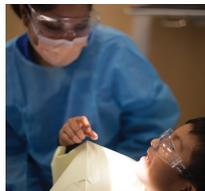


REVOLUTIONARY

## New Ways To Serve

At home in Newark and around the world, Rutgers School of Dental Medicine is marking new territory at the intersection of community service and dental education.

Our goal is to provide oral healthcare to all who need it regardless of age, economic means, location, or physical limitations. ■ We have been at the vanguard of treating HIV/AIDS patients, senior citizens, and those with disabilities. In 2002, we received federal Ryan White funding to become one of 12 community based dental partnership programs designed to increase access to oral health care for clients with HIV in underserved areas, a mission that continues. In 2014 we opened the Delta Dental of New Jersey Special Care Center, one of the only facilities in the region that treats patients with physical disabilities and mental disorders. It is an expanded, updated version of our facility for special-needs patients that was established at RSDM in 2001. We also opened the Brunsdon-Villa Pediatric Dental Center, which serves many underprivileged children in Newark. ■ RSDM's culture of service benefits not only our patients but our students. Unlike many dental schools, we offer a varied, intensive clinical experience that prepares them to meet a broad spectrum of needs. ■ Forty percent of our patients receive Medicaid, which few dentists accept. As a result, our students gain valuable insight into the effects of health care disparities. They treat children in excruciating pain from advanced



# 40%

Forty percent of our patients receive Medicaid, which few dentists accept. As a result, our students gain valuable insight into the effects of health care disparities.

### Milestones in Dentistry

**1887**

Ida Gray, the first African-American woman to earn a dental degree, graduates from University of Michigan School of Dentistry. Also that year, Willoughby Miller, an American dentist in Germany,



notes the microbial basis of dental decay in his book *The Micro-Organisms of the Human Mouth*. This generates unprecedented interest in oral hygiene and starts a worldwide movement to promote regular toothbrushing and flossing.

**1895**

Wilhelm Röntgen, a German physicist, takes the first medical x-ray of his wife Anna Bertha's left hand, wearing a ring. In 1896 dentist C. Edmund Kells takes the first dental X-ray of a living person in the U.S.



**1899**

Edward Hartley Angle paves the way for the dental specialty of orthodontics by identifying various forms of malocclusion.



REVOLUTIONARY

Since 2006, Aziz and his team have helped more than 1,000 patients who had lived for years with cleft lips and cleft palates, conditions that in wealthier nations are easily repaired.

stages of dental decay because preventive care had been inaccessible to them until they found RSDM. They provide implants and dentures to adults who have lived for decades with few or no teeth; suffer from poor nutrition because they can't chew, and have trouble finding jobs because they're ashamed to smile or hold a conversation. Every day our students learn how dramatically oral health care can improve someone's life.

We are also at the forefront of serving others beyond New Jersey, and we lead many unique overseas dental missions. Since 2004, RSDM has provided oral health care to Native Americans living on reservations, where, for two weeks, students and faculty staff dental clinics run by Indian Health Services. Few, if any, dental schools have this kind of relationship with a federal health agency.

Our faculty members travel to impoverished nations around the globe to teach and lecture on oral health care in addition to treating patients. In the past year they have been to Tanzania, India, and South America, to name a few.

No matter where our students and faculty are at work, a crucial part of our everyday mission is helping thousands of underserved patients lead healthier lives free of pain.

### NEVER TOO OLD

The patient was a Bangladeshi widower in his late 60s who longed to marry again. But since birth his face was disfigured by a cleft lip, and he feared he wouldn't find a second wife. When he heard about a clinic near his rural village that repaired hundreds of cleft palates each year, he made his way there and sought help.

RSDM oral surgeon Shahid Aziz treated the man, whom he believes is the oldest documented patient to undergo cleft lip surgery.

"We fixed his cleft, and he found a wife," says Aziz.

Since 2006, Aziz and his team have helped more than 1,000 patients who had lived for years with cleft lips and cleft palates, conditions that in wealthier nations are easily repaired with a 60-minute surgical procedure.

In the United States, the surgery is common and almost always performed on infants. But in Bangladesh, Aziz operates on many older children and on adults who have lived with the deformity all their lives. "They pretty much go into a shell and don't become a part of society, and it's really sad," he says. "This surgery gives them their life back."

Only about 30 surgeons in Bangladesh can repair cleft palates, and Aziz estimates that there are more than 300,000 people in that country with the condition. "There's a tremendous need," says Aziz, who was born in Bangladesh and grew up in New Jersey.

Twice a year Aziz and RSDM oral surgery residents visit the nation for two weeks to perform the surgeries, mostly on rural villagers who lack money and access to treatment. With help from Smile Train and other organizations, Aziz has formed his own nonprofit, Smile Bangladesh, since he began the trips with RSDM. In nine years he has witnessed many dramatic transformations. "I've seen mothers who break down crying when they see their child after surgery—it's like a weight has been lifted off them."

He tells the story of one father, a fisherman, who was so grateful that he fell to his knees after the surgery. "He

## Milestones in Dentistry

1905

Alfred Einhorn, a German chemist, formulates the local anesthetic procaine, later marketed under the trade name Novocain.

1907

William Taggart invents a "lost wax" casting machine, allowing dentists to make precision-cast fillings.



1907

Created by druggist Roswell van Buskirk of New Jersey, Sozodont claimed to "arrest the process of decay." Despite its miraculous claims, Sozodont fell out of favor as dentists pointed out that "Sozodont . . . is far too alkaline for general use, and would . . . destroy the enamel of the teeth and make them yellow."



1908

Greene Vardiman Black, the leading reformer and educator in American dentistry, publishes his monumental two-volume treatise *A Work on Operative Dentistry*, which remains the essential clinical dental text for 50 years.



said, ‘You’ve now allowed my son to go back to school,’” Aziz recalls.

### FIVE HUNDRED SMILES AND COUNTING

When students at Cleveland Street Elementary School, in Orange, New Jersey, have a toothache, school nurse Lynn Jacobs is often the first to know. “I’m the one that sees them when they’re in pain,” she says.

Tooth decay is one of the most widespread chronic diseases in the U.S., affecting 42 percent of all children,

according to the National Institute of Dental and Craniofacial Research. Children with serious oral health problems can have difficulty eating, sleeping, and concentrating in school. As a result, more than 51 million school hours are lost each year to dental-related illnesses.

Jacobs hopes her students will defy the statistics. They are among more than 500 schoolchildren in Newark and nearby Essex County towns to have visited RSDM this year for free dental exams and sealants, which are applied to the teeth to help prevent cavities.

#### 1901

The New York Dental Society opens one of the first free dental clinics for children in the U.S. It later receives funding from camera mogul George Eastman, becoming the Eastman Dental Dispensary in 1917.



#### 1912

The U.S. Army Dental Corps is established as the first armed-services dental corps in the U.S. The U.S. Navy institutes its dental corps in 1912 that same year.

#### 1913

Alfred C. Fones opens the Fones School of Dental Hygiene in Bridgeport, Connecticut the first school for dental hygienists in the world. Fones is known as the “Father of Dental Hygiene.”

Jacobs hopes her students will defy the statistics. They are among more than 500 school children in Newark and nearby Essex County towns to have visited RSDM this year for free dental exams and sealants, which are applied to teeth to help prevent cavities.

The initiative, part of a nationwide campaign called Smiles Across America, is a partnership between RSDM and Oral Health America, an organization that increases access to oral health care, especially for the underserved.

Smiles Across America is the only program in the U.S. that provides grants to health care institutions so that they can work with community schools to establish sealant programs.

Made of clear, plastic-based materials, sealants prevent decay by covering grooves and pits on the surface of the teeth, where most cavities form. “For children who often lack access to regular dental visits, preventive measures like sealants can play a critical role in keeping them cavity-free,” says RSDM Dean Cecile A. Feldman. “Through this program we hope to keep many children in their seats, free of pain and ready to learn.”

### BORDERLINE

In two villages on the border of Haiti and the Dominican Republic, most residents see a dentist once a year—when RSDM students arrive on a mission called Cheerful Heart.

“When we’re not there, they’re not getting care,” says graduate Anna Novais, who went on the trip in 2014 as a student and returned this year as an alumna. “There isn’t a dentist for miles, and most people can’t afford the cost.”

Other dental schools travel to Haiti or the Dominican Republic to help impoverished patients, but it’s rare to find a dental mission that serves both countries simultaneously, given their different cultures and languages.

Since 2011, a team from RSDM team has set up a temp-

orary clinic in the rural village of Restauración, Dominican Republic; it also treats patients from nearby Tilori, Haiti. Conditions there are challenging. The clinic is established in a hospital that doubles as the village funeral home.

In these remote border communities, health care, if it exists at all, is underfunded and unable to accommodate an overwhelming flow of patients. A toothbrush is considered a luxury, and dental decay—along with the health problems associated with it—is rampant.

But RSDM faculty and staff have made a difference. Last year they saw more than 450 patients and performed 1,000 procedures in a week. The dental sealants and annual preventive care they’d provided in previous years have reduced caries.

One reason for the mission’s success is the diversity at RSDM. The trip, funded by Cheerful Heart, includes students who speak French and Creole as well as those who speak Spanish.

Since last year the dental mission has been joined by nursing students from William Paterson University, and the trip has been cited as a model for cross-cultural, interdisciplinary work.

For students, the experience has been both eye-opening and gratifying. Says Novais, “It’s incredible to see the smiles of the children there and how much they appreciate the work we do.”

### THE CODE

One of the first of its kind in the U.S., our Community-Oriented Dental Education (CODE) program was

## Milestones in Dentistry

**1923**

A Thanksgiving window display lists two things to be thankful for: Peace and a Dr. West’s (pre-nylon bristle) toothbrush.



**1926**

Dental schools become university-based after the Carnegie Foundation issues the Gies Report, a comprehensive report that examined the state of dental education. Dental education evolves into a professional discipline.

**1930**

The American Board of Orthodontics, the world’s first dental specialty board, is founded.

**1937**

Alvin Strock inserts the first Vitallium dental screw implant. Vitallium, the first successful biocompatible implant metal, was developed by Charles Venable, an orthopedic surgeon.



Students and staff from the Cleveland Street School in East Orange visited RSDM for a free check-up and dental sealants.

created in 1993 with the mission of extending RSDM's curriculum beyond school walls.

CODE provides students the chance to spend most of their fourth year training at RSDM's community-based sites in South Jersey, where they log 30 hours a week.

In a community health care center setting like CODE, they learn about the groups they serve and the challenges patients must face to find care. "They develop a sense of

the importance of social responsibility and the need to give back to communities during and after dental school," says Jill York, assistant dean for extramural clinics.

But the CODE program does more than treat underserved patients and help students hone their skills. It is also designed to prepare graduates to assume leadership roles in shaping the future of health care policies in New Jersey and nationwide.



**1937**  
"The President's Dentist," Commander Arthur C. Yando, Dental Corp of the U.S. Army, stopped to have his picture taken after pulling a molar for President Franklin Delano Roosevelt.

**1938**  
The nylon toothbrush, the first made with synthetic bristles, appears on the market. Much more comfortable than previously used boar's hair, it is marketed by Dupont as "Dr. West's Miracle Toothbrush." DuPont played upon



the public's fear of impending war by urging people to "support the troops" by brushing their teeth in their marketing campaign.



### Back to the Future

■ As a first-year student, Peter Paradiso was mystified by the school's dental museum — three glass display cases filled with antique equipment. "A lot of the pieces seem like props out of sci-fi movies," describes Paradiso, Class of 2016. But by his third year, the somewhat gothic-looking implements began to seem familiar. "We started recognizing the different pieces and what they were used for," he says. ■ The objects in the museum, donated by Tenafly dentist Perry Levinsohn in 1984, provide an illustrated look at dental history, from vintage chairs to the bottle of prohibition-era whiskey disguised as medicinal fluid. ■ Paradiso now has a deep appreciation for it all. "It's amazing to see how far our profession has come."

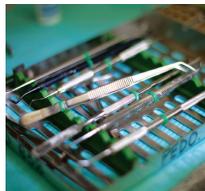


REVOLUTIONARY

# Groundbreaking Alumni

We are proud to have alumni who are groundbreaking leaders not only in our profession but in other arenas, from international politics to the American Civil Rights movement.

**T**hey have forged new inroads in dentistry as well as clinical and industrial research. Some have paved the way for the rich ethnic and gender diversity that RSDM enjoys today. ■ Their stories, struggles, and insights serve as valuable examples for our students. Many have stayed involved with RSDM as staff or faculty members, including several who volunteer their time to teach. Our large network of donors, which comprises many alumni, gave us \$1.2 million in fiscal year 2014. ■ Among those who offer support are the state’s many professionals who, in turn, rely on us to help expand their knowledge and advance their careers. Our Continuing Dental Education program offers innovative courses such as a class in forensic dentistry, which teaches students how dental records, dental remains, and bite marks can yield valuable crime-solving information. Normally offered to predoctoral students, it’s now open to oral health care professionals, who could one day increase the pool of qualified forensicists during national emergencies and disasters. ■ Other courses offer information on the latest advances in orthodontics and other dental specialties. We are one of only nine facilities in the world to offer the American Academy of Implant Dentistry’s MaxiCourse, which shares the most recent implantation knowledge and techniques.



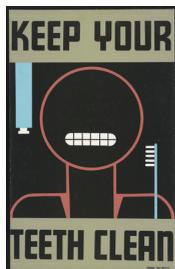
# \$1.2M

Our large network of donors, which is made up of many alumni, gave us \$1.2 million last year.

## Milestones in Dentistry

**1938**

The Works Progress Administration (WPA)'s Federal Art Project branch hired artists to create posters promoting education, art, culture, health, and . . . good oral hygiene.



**1940**

Dentists began to serve children in larger numbers during the Great Depression, in schools and clinics. Signifying professional legitimacy, the American Society for the Promotion of Dentistry for Children was renamed the American Society of Dentistry for Children.



**1941**

A dentist reassures a migrant child making her first visit to a dentist at a Farm Security Administration (FSA) dental trailer at the FSA camp for farm workers in Caldwell, Idaho. The FSA was created during the Depression as an effort to combat American rural poverty.



REVOLUTIONARY

RSDM alumnus Dr. George McLaughlin also shaped history. He was among a small but growing wave of students who turned out to support the original lunch counter protesters and kept showing up, eventually sparking a nationwide flood of protests at lunch counters across the U.S.

In 2014, 100 percent of our MaxiCourse students passed the written American Academy of Implant Dentistry exam.

Every day we work closely with state, local and national dental organizations, sharing our knowledge and expertise as purveyors of new ideas and advances in oral health care.

### COUNTER CULTURE

The first four students who refused to leave the segregated lunch counter at a North Carolina Woolworth's store are remembered today as heroes of the civil rights movement.

But people like RSDM alumnus Dr. George McLaughlin—who joined his classmates during the early days of their sit-ins—also shaped history. He was among a small but growing wave of students who turned out to support them and kept showing up, eventually sparking a nationwide flood of student protests at lunch counters across the U.S.

Many, like McLaughlin, endured threats and harassment by angry whites, who tossed lit cigarettes at them or threw food and drinks. “We just kept sitting there. We would line up behind the stools, and when one student would get up, another would sit down,” remembers McLaughlin, an associate clinical professor in the Department of Restorative Dentistry at RSDM.

In 1960, McLaughlin was studying to become a mechanical engineer at North Carolina Agricultural and Technical State University (N.C. A&T), in Greensboro. The four initial protestors were fellow students, and although

McLaughlin didn't know them very well, he felt an immediate sense of solidarity.

Like them, he grew up in the Jim Crow South. His hometown of Raeford, North Carolina, had separate and unequal schools for black students and one for Native American children, who were subject to the same laws of segregation as black residents.

McLaughlin, whose parents were farmers, has childhood memories of white students shouting racial slurs out the bus window as black students waited for their own bus



## Milestones in Dentistry

1942

Dentist Benjamin Lewis Solomon becomes an officer in the Army Dental Corp. During the Battle of Saipan he stood a rear-guard action in which he had no hope of personal survival, allowing the safe evacuation



of all wounded soldiers before being killed himself. He is one of only three dental officers to receive the Army Medal of Honor. (The others are Alexander Gordon Lyle and Weedon Osborne.)

1943

The Armed Forces had to deal with a huge recruitment of troops after Pearl Harbor was invaded. They gradually made up their lack of staff by massive training of army dentists, in close cooperation with American dental schools and by taking on many civilian dentists.





Dr. Kendal Major

## PUBLIC SPEAKER

Kendal Major’s life is filled with history-making milestones. In 1989 he became the first periodontist in his homeland—the Bahamas—and one of just 54 black periodontists in the U.S. after he graduated from RSDM’s residency program.

In 2012 Major was elected to the Bahamian Parliament, where he became the third youngest speaker of the assembly in the governing body’s 285-year history. But invariably, Americans who meet him for the first time want to know about his magistrate’s wig—the 18th-century-era hairpiece he must wear on ceremonial occasions of state.

Major is used to such questions.

“It’s made of horsehair,” he answers patiently.

Is it uncomfortable?

“Yes,” he confirms. “It’s hot and itchy.”

The son of a Bahamian telex operator and a cashier, Major’s childhood career goals had nothing to do with dentistry or politics. He wanted to be a veterinarian.

“Then I decided I loved dogs and cats, but I didn’t love larger animals,” he explains. “So it became obvious to me I had to find something else.”

That something was dentistry. Major attended Howard University College of Dentistry and later decided to specialize in periodontics, then an emerging field. He was accepted into RSDM’s program in 1987, a time when there were only about 2,000 periodontists worldwide.

After graduating from RSDM, he returned to the Bahamas to open a practice as a way of giving back to his fellow Bahamians. His ultimate goal is to become prime minister.

to school. Sometimes there was violence. It wasn’t uncommon for white drivers to intentionally run black pedestrians off the road, he says.

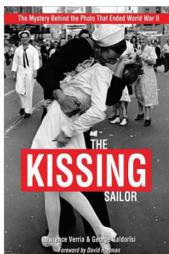
Students at N.C. A&T, a historically black college, often shopped at the Woolworth’s in downtown Greensboro but had to obey Jim Crow laws. “We would go buy school supplies and something to eat, but we couldn’t sit down and eat it,” says McLaughlin, who went on to take engineering jobs with the U.S. Department of Defense and Westinghouse before pursuing a dental degree at and graduating from RSDM in 1975. He is among the school’s first 10 black graduates.

When Woolworth’s changed its policy in July 1960, five months after the Greensboro sit-ins had begun, students at N.C. A&T declared victory.

“We made a difference,” McLaughlin says. “I think it shows that it doesn’t take a lot of individuals to start a movement.”

1945

The authors of *The Kissing Sailor* reveal that the “nurse” in the iconic D-Day celebration photograph, was, in fact, a dental assistant who had walked over to Time Square on her break.



1945

The water fluoridation era begins when the cities of Newburgh, New York, and Grand Rapids, Michigan, add sodium fluoride to their public water systems.

1948

President Harry S. Truman signs the congressional bill formally establishing the National Institute of Dental Research. It’s created, in part, in response to the high rate of men rejected from the World War II draft due to dental defects.





REVOLUTIONARY

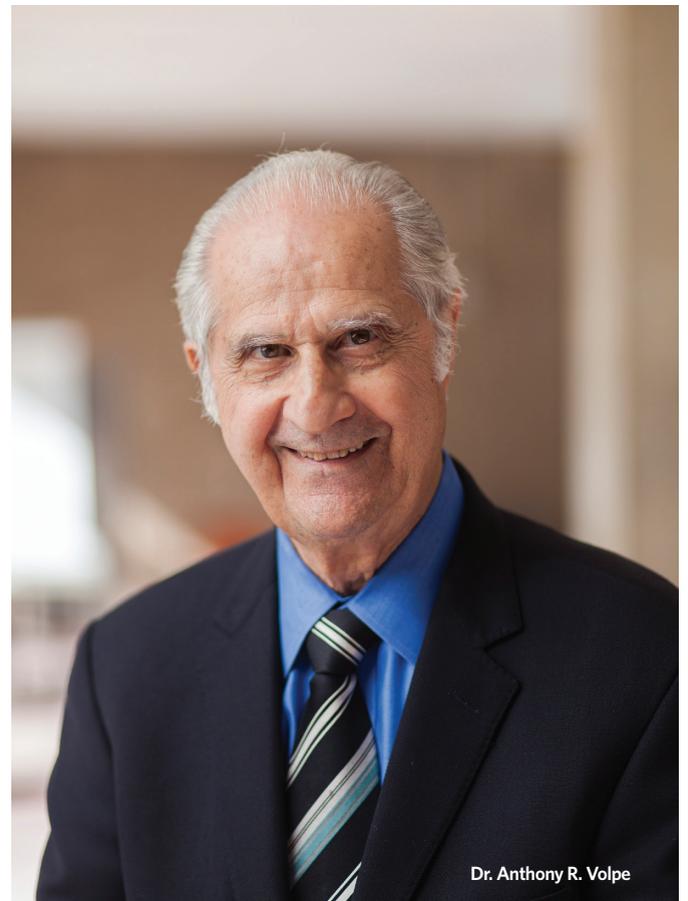
Says Major, “I want to change the life of many of my people and get them on the right path economically, socially, and educationally. Each of us has a duty to find our gift and promote it to the world for the betterment of mankind. I was inspired to believe that I could help make the world a better place.”

### DENTAL REVOLUTIONARY

In the 1950s, toothpaste was merely something that made your teeth white and your breath fresh. But Dr. Anthony R. Volpe, an RSDM alum, helped change that. As head of global oral health care and scientific affairs at Colgate-Palmolive for more than five decades, Volpe was instrumental in the company’s efforts to transform toothpaste and mouthwash from products with a mostly cosmetic value to tools for preventing tooth decay and gum disease.

He has been a pioneer in establishing ties between industry and academic research in oral biology. Volpe, of the Class of 1960, the first graduating class at Rutgers School of Dental Medicine, has played a key role in building Colgate’s reputation as the most influential dental industrial company in the world.

At Colgate, Volpe conducted studies on the efficacy of certain types of fluoride and other compounds that would become active ingredients in the brand’s products. His research on Total toothpaste helped secure unprecedented approvals from the Food and Drug Administration and the American Dental Association’s Council on Scientific Affairs, which validated the company’s claims that Total



Dr. Anthony R. Volpe

effectively reduced dental plaque, gingivitis, tooth decay, and dental calculus, a calcified form of plaque. Before that, he cocreated the Volpe-Manhold Index, a now-standard method of measuring dental calculus.

A driving force behind Volpe’s career has been his conviction that limited access to oral health care and education, especially among the poor, results in a magnitude of suffering that is unknown to the general public and overlooked by government officials. At Colgate, Volpe studied incidents of dental caries around the globe and dedicated himself to prevention efforts.

At RSDM, Volpe has been an invaluable resource. He helped create the New Horizons program, which introduces students to careers that transcend private practice, such as performing clinical studies for companies like Colgate and

## Milestones in Dentistry

### 1950

The first fluoride toothpastes are marketed. The famous “Look Mom, no cavities” marketing campaign is launched. By 1960 Crest toothpaste sales would skyrocket when The American Dental Association recognizes the toothpaste as “an effective decay-preventive dentifrice.”



### 1957

John Borden introduces a high-speed, air-driven contra-angle handpiece. The Airotor obtains speeds of up to 300,000 rotations per minute and is an immediate commercial success.

### 1958

A fully reclining dental chair is introduced.





Hoda Yousef

working in military and forensic dentistry. He has been a generous supporter of the school, donating money and time to raise more than \$5 million for RSDM's Oral Health Pavilion in Newark, its planned \$13 million interdisciplinary clinic, and many of the school's clinical studies.

Says Volpe, "At the end of the day, a person's contributions are what they gave to society, not what society gave to them."

### KEEPING THE FAITH

As one of RSDM's first female Muslim students, Hoda Yousef was asked a lot of questions. It was the late 1980s, and some students told her they'd never met a Muslim before. Because she wears a hijab, the head covering worn by devout Muslim women, they asked if she spoke

English. Yes, she would answer, explaining that she grew up in Monmouth County after arriving in the United States with her family from Egypt at age 3.

Tired of the stares and misperceptions, she fleetingly considered leaving the hijab at home but decided against it. "I thought, Why should I? This is America—this is my home, where anybody can be anything and have the right to live the way they want to live."

Yousef is glad she stuck it out. "I think that your struggles strengthen you," she says.

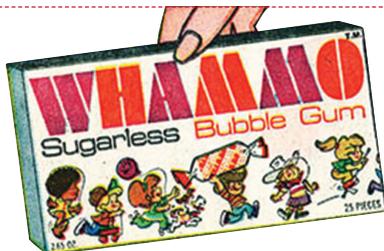
Now an associate professor at RSDM, Yousef graduated from the school in 1991 and earned a certificate here in prosthodontics and a Masters of Science degree in 1996. She is course director Fixed Prosthodontics and does research in the biomechanics of dental implants. Yousef lectures internationally on implant systems and what factors will increase their effectiveness and works with implant companies. She's also senior editor of the *Implant Dentistry Journal* and a fellow of the International College of Dentistry, among other honors.

Yousef was drawn to dentistry because it enabled her to pursue both science and artistry. "I liked the aspect of it that allowed the creative part of you to come out," she says. "With restorative dentistry, I liked taking something and recreating it."

But one of Yousef's greatest passions is teaching. "I like to give more than take, and education is the best way to express that," she says. "When I have a student who finally gets something and really understands, it gives me great satisfaction and is the best gift ever."

#### 1960

Sit-down, four-handed dentistry becomes popular in the U.S., improving productivity and shortening treatment time. That same year, lasers are developed and approved for soft-tissue work, including treatment of periodontal disease. As consumers became more health conscious



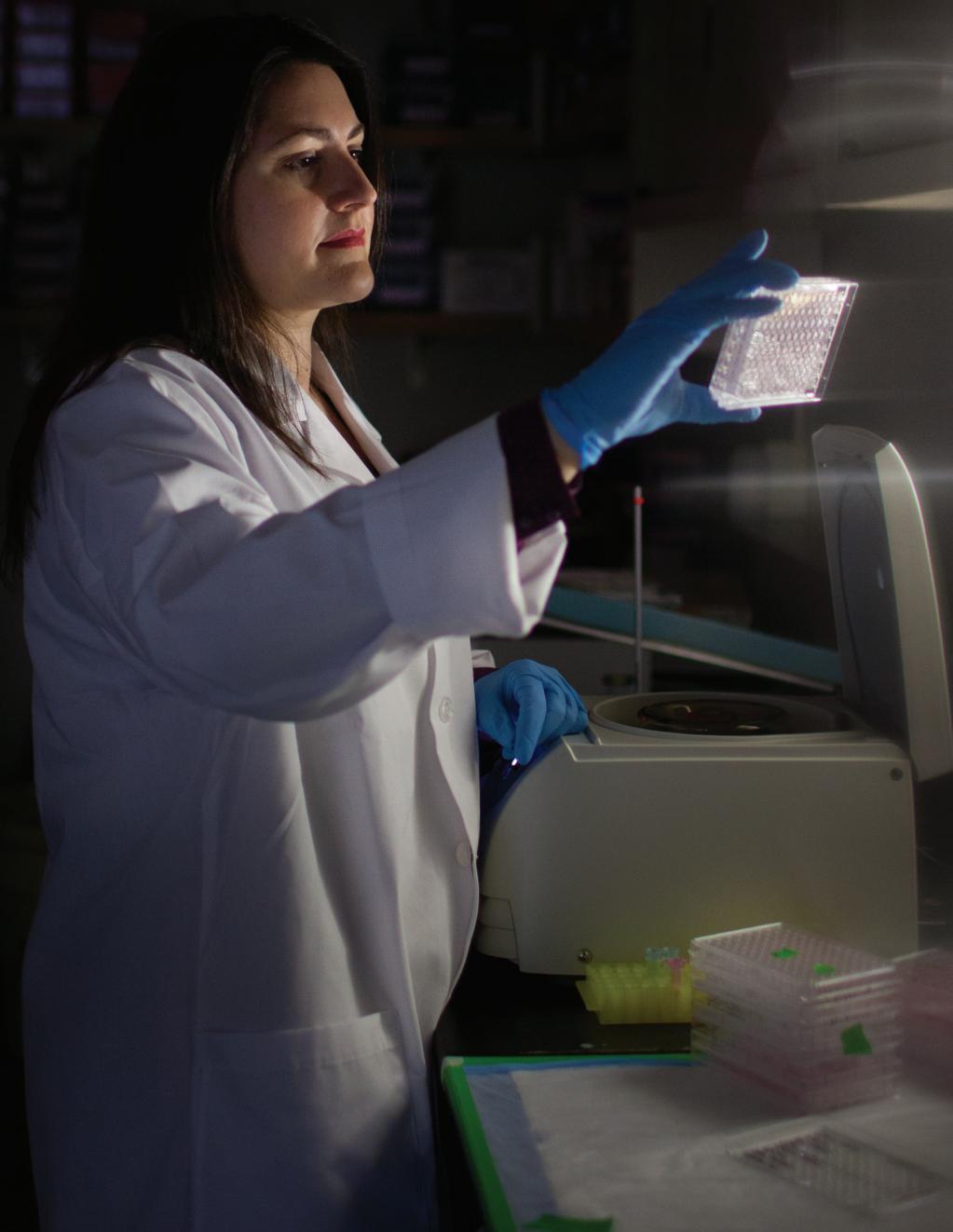
in the early 60's, sugarless gum was commercially introduced. (The original idea belonged to a dentist, Dr. Bruno Petrusis, of Naperville, IL. "Whammo", introduced by Amurol Confections, becomes the first sugar-free, soft bubble gum. (It's name didn't stick, and it became "Blammo" in the early 1970s.)

#### 1961

The first commercial electric toothbrush, which was developed in Switzerland after World War II, is introduced in the U.S.



RSDM researcher Carla Cugini studies how bacteria communicate and adapt to their host's immune system. Her findings could result in therapies for periodontitis and a range of mucosal diseases.





REVOLUTIONARY

# Research Vanguard

Research at Rutgers School of Dental Medicine has radically redefined how the disciplines of dentistry and oral health care can yield potential treatments for systemic diseases.

**T**he work of our faculty could yield potential treatments for illnesses such as such as leukemia, tuberculosis, and Middle East Respiratory Syndrome (MERS). Other studies have deepened our understanding of how the human body fights infection and tolerates pain. ■ In fiscal year 2015 we received more than \$11 million in funding, including three federal grants for research into treatments for cancer, drug-resistant pathogens, and a rare, genetic form of periodontal disease that strikes up to 2 percent of African-American adolescents. In 2014 we were awarded \$4.5 million in funding. ■ At the Center for Oral Infectious Diseases, researchers have made great strides in exploring how bacteria drawn from the oral cavity can be used to eliminate toxins that attack the body’s immune system. The work they produce is unique among dental schools, and their findings have been truly revolutionary. In fiscal years 2014 to 2015, the department received three grants from the National Institutes of Health (NIH) and one from the Defense Advanced Research Projects Agency (DARPA), part of the U.S. Department of Defense. ■ “Our strategy has been to take the knowledge bacteria have acquired over a million years to protect themselves,” says Dr. Daniel Fine, chair of the Department of Oral Biology and associate dean for



**2,500**  
That's how many Newark children have been tracked since 2007 to chart the progression of a rare form of gum disease that afflicts African-American adolescents.

## Milestones in Dentistry

**1962**

Rafael Bowen develops Bis-GMA, the thermoset resin complex used in most modern composite resin restorative materials.

**1967**

Close Up by Unilever becomes the world's first gel toothpaste.

**1970s**

Employers begin coverage for dental services after the United Auto Workers include this benefit as part of its collective bargaining agreement with the auto industry.



**1977**

The James Bond henchmen known as “Jaws” debuts in *The Spy Who Loved Me* and goes on to become a fan favorite. The villain, played by actor Richard Kiel, had a mouth full of steel teeth.



“Our strategy has been to take the knowledge bacteria have acquired over a million years to protect themselves. How did they figure out how to survive in a world that doesn’t want them?”

- DR. DANIEL FINE, CHAIR OF THE DEPARTMENT OF ORAL BIOLOGY; ASSOCIATE DEAN FOR RESEARCH.

research. “How did they figure out how to survive in a world that doesn’t want them? We want to use that to develop novel anti-infectious organisms and methods.”

Another magnet for innovative research at RSDM is the Center for Orofacial Pain, an international leader in the field. Its faculty members have been instrumental in establishing the study of chronic orofacial pain as an emerging specialty worldwide. “We examine how the pain system copes under chronic conditions,” says Rafael Benoliel, director of the center and associate dean for research at RSDM.

The center has been especially successful at garnering widespread medical recognition of certain clinical phenotypes, or clusters of symptoms, to improve diagnosis and treatment.

In the past two years the Center for Orofacial Pain has been conducting studies on how the body processes pain and experiments with topical analgesics and other treatment methods. In addition, researchers at RSDM have patented medical technology and worked closely on clinical trials for Colgate-Palmolive and other companies.

#### FROM ORAL BACTERIA TO CANCER THERAPY

Thanks to RSDM researcher Scott Kachlany, a drug proven to kill leukemia cells in animals is closer to reaching human patients. In October 2014 he was awarded nearly \$1 million from the NIH to fund the process of obtaining U.S. Food and Drug Administration approvals.

Kachlany, an associate professor in the Department

of Oral Biology, and his company, Actinobac Biomed, were awarded a grant in October 2014 from the NIH’s National Cancer Institute to develop a potential treatment for blood cancers and autoimmune inflammatory diseases, such as rheumatoid arthritis, multiple sclerosis, and Crohn’s disease.

Several years ago, Kachlany discovered that a protein produced by the same bacterium that causes periodontal disease eliminates diseased white blood cells. His company develops the protein into a drug, named Leukothera, which is made from the same biologic agent that specifically targets and depletes these cells.

With the NIH grant, Actinobac Biomed will perform preclinical studies that will allow testing to begin on humans, possibly within the next two years. “The goal is to treat cancer and allow it to go into remission,” he says.

#### NO PAIN, NO GAIN

Scientists know that exercise helps the body tolerate pain. But some people feel more benefits than others.

That same variable factor—your post-workout level of pain sensitivity—could provide important clues to your chances of developing chronic pain, according to RSDM researcher Junad Khan.

In a 2014 study published in the Journal of Pain, Khan found that rats displaying the least amount of pain sensitivity after running on a treadmill were also less likely to develop pain after a nerve injury.

The results suggest that exercise could be a valuable component in helping doctors predict susceptibility to

### Milestones in Dentistry



**1980**  
Per-Ingvar Brånemark describes techniques for the osseointegration of dental implants.

**1989**  
The first commercial home tooth-bleaching product is marketed.

**1990**  
The increased use of bleaching, veneers, and implants inaugurate an era of aesthetic dentistry.

**1995**  
New tooth-colored restorative materials gain widespread popularity.

**1997**  
The FDA approves the erbium YAG laser, the first for use on dentin to treat tooth decay.



**1998:**  
Invisalign clear orthodontic device approved by the Food and Drug Administration.



Dr. Junad Khan



Dr. Scott Kachlany

pain, particularly following injury or surgery, says Khan, an assistant professor of diagnostic sciences who led the study with former faculty member Eli Eliav, now dean for oral health at the University of Rochester School of Medicine and Dentistry.

The phenomenon of pain reduction after exercise is known as “exercise-induced hypoalgesia (“EIH”). Khan and his team believe that an individual’s capacity for EIH, or their EIH profile, can indicate how efficiently their body modulates pain, meaning how it manages both the sensation and the suppression of pain.

Chronic pain conditions such as fibromyalgia, migraine, chronic lower back pain, and temporomandibular disorder have been shown to be associated with faulty pain modulation. “We hope that the finding from this study could support the development of individual pain management plans,” says Khan.

**RARE DISEASE, POTENTIAL CURE**

Oral biologist Daniel Fine and his team have tracked more than 2,500 Newark children since 2007 to chart the progression of a rare form of gum disease that afflicts African-American adolescents.

The disease, called localized aggressive periodontitis, has a genetic basis and affects 2 percent of African-American children ages 11 to 17.

A \$3.3 million grant from the NIH will help Fine and his team pinpoint biological markers in saliva that can predict whether the disease will cause bone loss and which teeth it will affect before there are symptoms.

Because the disease only attacks central incisors and

**1998**

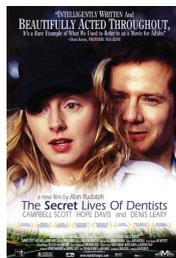
The National Institute of Dental Research is renamed the National Institute of Dental and Craniofacial Research to accurately reflect the broad research base that it has come to support.

**2001**

Cone-beam technology is introduced in the U.S.

**2002:**

Release of the film *The Secret Lives of Dentists* starring Campbell Scott and Hope Davis about an introspective DMD and his domestic problems.



**2003**

The American Dental Association (ADA) launches the nationwide Give Kids A Smile program to encourage dentists to provide care for underserved children.

**2005:**

The Delta Dental Original Tooth Fairy Poll tracks the going rate for a child’s primary teeth at about \$2.00 apiece. (Average tooth price varies by U.S. region, with children in the South receiving the largest gifts.)



According to Parashar, if scientists can decode the bacteria’s signaling process, they might be able to abort the chain of events that results in disease. . . .“Then you don’t have to eradicate the bacteria,” Parashar explains. “You just stop bacteria from doing what you don’t want them to do.”

molars, it can result in disfiguring tooth loss and difficulty in eating among a demographic that often has limited access to dental care.

Fine’s research into early diagnosis of localized aggressive periodontitis, which affects 70,000 children in the U.S. can pave the way for early interventions. His work also sheds light on the biological basis for other forms of periodontitis, a disease that affects nearly half of Americans over age 30.

### CELL TO CELL

Biologists used to think bacteria were dull organisms that reproduced on their own without responding to one another or their environment. As it turns out, they have intricate ways of communicating with each other and the microbial world around them.

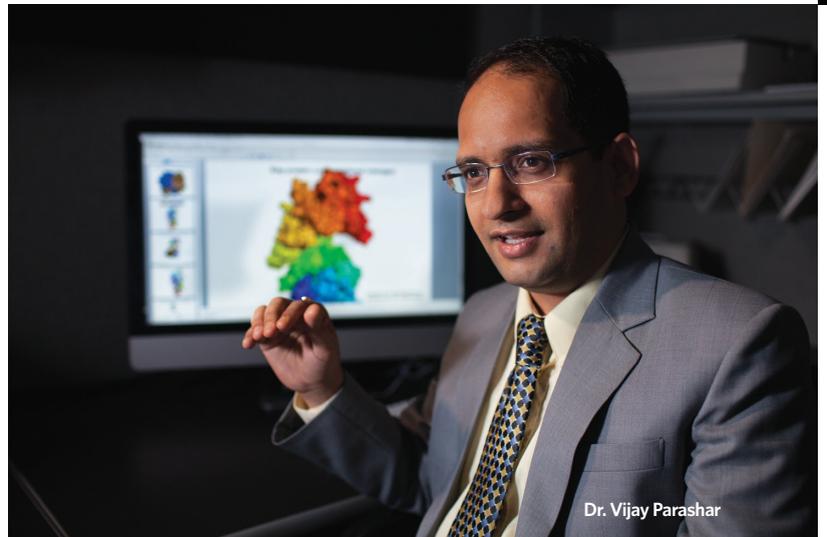
RSDM researchers Carla Cugini and Vijay Parashar study how this happens, each seizing upon different organisms—and employing different methods—to explore how bacteria adapt to their hosts’ immune system. In 2014 both won \$35,000 from the New Jersey Health Foundation, which funds biomedical research.

Parashar, a structural biologist, takes photos of organisms so small that they can’t even be seen under a microscope. He uses a technique called X-ray crystallography to build three-dimensional representations of submi-

croscopic cellular enzyme molecules so he can determine how they function.

According to Parashar, if scientists can decode the bacteria’s signaling process, they might be able to abort the chain of events that results in disease. He hopes his research will aid in developing an alternative to present-day antibiotics, which eradicate essential bacteria along with those that cause illness, driving them to develop the tactics that lead to drug resistance.

“Then you don’t have to eradicate the bacteria,” Parashar explains. “You just stop bacteria from doing what you don’t want them to do.”



Dr. Vijay Parashar

## Milestones in Dentistry

**2008:** The U.S. National Institute of Dental and Craniofacial Research (NIDCR) celebrates the 60th Anniversary of its role in providing prevention and understanding of oral health and biology.



**2009:** The YouTube video *Kid Reacts to Anesthesia after Dentist Visit* goes viral. Among the most memorable scenes? A disoriented child asking dad, “Is this real life?”



**2010:** The Affordable Healthcare Act, which dramatically expands pediatric dental coverage, is signed into law.

During the final season of *Ugly Betty*, an American television series which revolves around an awkward young heroine, Betty’s braces (which have a featured role on the series) finally come off.



Dr. Daniel Kadouri

Cugini is examining how protein in the bacteria responsible for periodontitis strikes back against the immune system.

She explores how a bacterial protein called ApiA helps form biofilm and fights the body's attempts to destroy it. Both functions are a product of the dialogue between the protein and the immune system, but few scientists have analyzed the mechanics of how it occurs.

Cugini's findings could someday result in therapies for periodontitis and a range of mucosal diseases.

**SECRET WEAPON**

With help from a cooperative agreement for up to \$7.2 million from the U.S. military, microbiolo-

gist Daniel Kadouri is at the forefront of the race to fight drug-resistant bacteria.

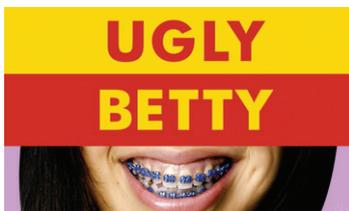
Kadouri is the principal investigator of a project that examines the therapeutic potential of two types of predatory bacteria that kill germs that have developed a resistance to antibiotics.

According to the Centers for Disease Control and Prevention, infections caused by drug-resistant pathogens — a result of the overuse of antibiotics — now pose urgent and serious threats to public health.

Kadouri's effort is funded by the Defense Advanced Research Projects Agency (DARPA) Pathogen Predators program, which develops alternative methods of fighting infections and disease. The effort is managed through a cooperative agreement with Rutgers University, DARPA, and the Army Research Office (ARO).

Kadouri will continue his research on two types of predatory bacteria that are lethal to microorganisms that cause disease: *Bdellovibrio bacteriovorus* penetrates prey and kills from within. *Micavibrio aeruginosavorus* devours germs from the outside. In addition to eradicating bacteria that cause lung disease, and germs that develop from wounds and burns, the predatory bacteria fight food borne pathogens like E. coli and Salmonella.

In the most recent phase of his work, Kadouri and his team will delve deeper into studies that explore how animals are affected by the predatory bacteria—and how the bacteria combat illness and infection in animals. Preliminary research has indicated that the bacteria are non toxic to mice, says Kadouri.



**2011**  
Three-dimensional printers, which can quickly manufacture crowns, bridges, and a range of orthodontic appliances, become increasingly widespread in dental offices.

**2014**  
The tooth tattoo trend (colorful etchings on tooth enamel), makes news.



**2015**  
The U.S. Supreme Court rules that a North Carolina state dental board cannot exclude non-dentists from offering teeth whitening services. According to the court, such restrictions are a violation of anti-trust laws.

# RSDM Administrators

**T**he associate and assistant deans, department chairs and senior administrators make up our Administrative Council, headed by Dean Cecile A. Feldman. In addition to their duties at Rutgers School of Dental Medicine, most of them belong to a variety of professional organizations and hold elected or appointed offices.

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# 2014 Timeline

## February



**RSDM OFFICIALLY** opens new clinics for children and special-needs patients: the Brunsdon-Villa Pediatric Dental Center for children, which logged nearly 7,500 visits in 2014, and the Delta Dental of New Jersey Special Care Center for patients with disabilities, which received nearly 4,000 visits.

## January



**COLLEGE STUDENTS** from across the country converge at RSDM to participate in our Gateway to Dentistry program. The first program of its kind nationwide, Gateway provides college undergrads with hands-on experience acquiring preclinical dental skills.

## March



**STUDENTS SHOWCASE** their research and presentation skills on Balbo Day, when they are judged on posters they created for the event.



## April

**RSDM WELCOMES** more than 25 students to its Internationally Trained Dentist program. The program enables qualified dentists educated outside the United States and Canada to earn a DMD degree, which allows them to acquire a license to practice in the United States.



## May

**DURING A HISTORIC** ceremony, 107 RSDM students graduate at the school's convocation, held in Newark. The Class of 2014, admitted when the school was part of the University of Medicine and Dentistry of New Jersey (UMDNJ), leaves as alumni of Rutgers. The two universities integrated in 2013.

## June

**STUDENT AND FACULTY** volunteers join the Special Olympics Healthy Athletes initiative, where they provide Special Olympics athletes with dental screenings and dispense tips on oral health.

JANUARY

JULY

FEBRUARY

AUGUST

MARCH

SEPTEMBER

APRIL

OCTOBER

MAY

NOVEMBER

JUNE

DECEMBER



## July

**RSDM HOSTS** students from Dublin Dental School and Hospital in Ireland as part of an exchange program for students to learn about oral health in other countries. In October 2014, RSDM students travel to Dublin on a trip funded by the International College of Dentists.

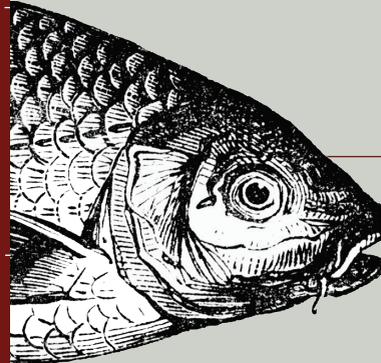
## August



**BY DONNING** white coats, the incoming Class of 2018 is welcomed to the world of dentistry. The white coat is symbolic of the medical profession's commitment to ethics, compassion, and patient trust. Once reserved for medical students, the white coat ceremony has been held at RSDM for over a decade.

## September

**RSDM FACULTY** and students cast lines at a fishing outing for people with disabilities. They volunteer to help a variety of anglers, from those with Down syndrome to others who are deaf or blind.



## October

**RSDM OFFERS** its forensic dentistry course as a continuing dental education class. Already offered to predoctoral students, it teaches oral health care workers how dental remains and records can be used to help solve crimes.



## November

**DEAN CECILE A. FELDMAN** speaks out on student debt reduction in the *Journal of Dental Education*. According to Feldman, easing the burden of student debt can result in an increase in the number of dentists who treat the underserved.

# BIG

## December

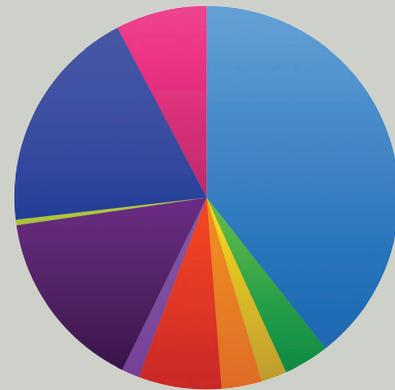
**BIG TEN DENTAL DEANS** meet at RSDM. Dean Feldman hosts a conversation on the challenges and potential of belonging to a Big Ten academic community.



# Financial Report 2013-2014

## 2014 Revenues

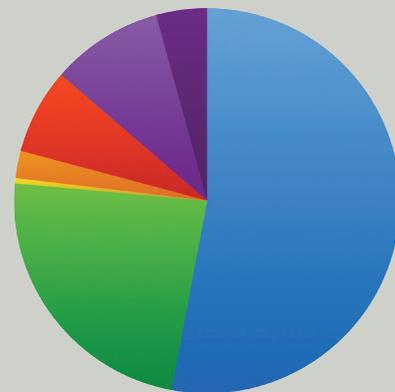
Revenues	2014 Actual IN MILLIONS OF DOLLARS	Percent
1. Tuition and Fees	\$23,084	39.4%
2. Faculty Practice Plan Services	\$2,247	3.8%
3. Housestaff Recoveries	\$1,255	2.1%
4. Affiliate Revenues	\$1,986	3.4%
5. Recoveries of Dir. Grant Exp.	\$4,094	7.0%
6. Indirect Cost Recoveries	\$878	1.5%
7. Patient Service Revenues	\$9,043	15.4%
8. Donations and Endowment Inc.	\$274	0.5%
9. State Appropriations - Direct	\$11,230	19.2%
10. Other	\$4,504	7.7%
<b>Total Revenues</b>	<b>\$58,595</b>	<b>100.0%</b>



- Tuition and Fees
- Faculty Practice Plan Services
- Housestaff Recoveries
- Affiliate Revenues
- Recoveries of Dir. Grant Exp.
- Indirect Cost Recoveries
- Patient Service Revenues
- Donations and Endowment Inc.
- State Appropriations - Direct
- Other

## 2014 Expenses

Expenses	2014 Actual IN MILLIONS OF DOLLARS	Percent
1. Salaries and Wages	\$30,288	53.0%
2. Non Salary	\$13,421	23.5%
3. Housestaff Salaries/Other	\$1,312	2.3%
4. Direct Grant Expenses	\$4,105	7.2%
5. Life Cycle Management	\$5,364	9.4%
6. Debt Service	\$250	0.4%
7. Central Administrative Costs	\$2,443	4.3%
<b>Total Expenses</b>	<b>\$57,183</b>	<b>100.0%</b>



- Salaries and Wages
- Non-Salary
- Housestaff Salaries
- Direct Grant Expenses
- Life Cycle Management
- Debt Service
- Central Administration Costs



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