Message from the Senior Executive Associate Dean for Research

Winter is upon us, even here in Memphis this season. While Mother Nature takes her toll on us and others around the country, our faculty, staff and students are hard at work with various research endeavors.

It is with pleasure that I announce that at the end of the calendar year, the UTHSC Bioscience Research team was acknowledged as the number one Plaque Glycolysis and Regrowth Model (PGRM) facility in the world. Our Bioscience Research team continues to work at the helm of leading hygiene products while furthering the model as a guideline for the dental industry.

In the fall, the International Association for Dental Research recognized Dr. George Huang, Department of Bioscience Research, as the recipient of the 2015 Distinguished Scientist Award for Pulp Biology and Regeneration Research.

To date this 2015 fiscal year, our faculty has disseminated their research results by publishing approximately 70 research articles. In similar fashion our students gave presentations on their research projects. This year 26 predoctoral and 12 postdoctoral dental students presented their work at the Annual Student Research Day.

With spring fast approaching, our students are gearing up for new research beginnings. We currently have 22 students enrolled in the Student Research Program for this year.

I’m delighted to see that so many first-year dental students have decided to try their hand in dental research. It is my absolute goal as Senior Executive Associate Dean for Research that every dental student and faculty member here at UTHSC finds their niche in the wide spectrum that is dental research. It is imperative that all students and practicing dentists alike value the integration of research fundamentals into their clinical practice.
Dr. Kalid Hosn, periodontics resident, discussed his research with a faculty judge at the Annual Student Research Day.

Dr. George Huang received the 2015 Distinguished Scientist Award for Pulp Biology and Regenerative Research.
## Research Faculty

DEPARTMENT OF BIOSCIENCE RESEARCH  
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### Franklin Garcia-Godoy, D.D.S., M.S., Ph.D., Ph.D.  
Senior Executive Associate Dean for Research  
Chair, Department of Bioscience Research  
Director, Bioscience Research Center  
Professor, Department of Physiology, The University of Tennessee Health Science Center  
Adjunct Research Professor, Department of Biomedical Engineering, The University of Memphis  
Senior Clinical Investigator, the Forsyth Institute, Boston, Massachusetts  
Adjunct Professor, Department of Conservative Dentistry and Periodontology, Ludwig-Maximilians, University of Munich

#### FACULTY

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>Jegdish Babu, B.S., M.S., Ph.D.</td>
<td>Associate Professor</td>
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<td>Mustafa Dabbous, M.S., Ph.D.</td>
<td>Professor</td>
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<td>Edward Harris, Ph.D.</td>
<td>Professor</td>
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<tr>
<td>George T.J. Huang, D.D.S., M.S.D., D.Sc.</td>
<td>Professor and Director for Stem Cells and Regenerative Therapies</td>
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<tr>
<td>Chris Ivanoff, D.D.S.</td>
<td>Associate Professor</td>
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<td>Mark Scarbecz, Ph.D.</td>
<td>Professor</td>
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<td>Edwin Thomas, M.S., Ph.D.</td>
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<td>David Tipton, D.D.S., Ph.D.</td>
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<td>Dan Tylka, D.M.D., M.S.</td>
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<td>Antheunis Versluis, Ph.D.</td>
<td>Professor</td>
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<tr>
<td>Yanhui Zhang, B.S., M.S., Ph.D.</td>
<td>Assistant Professor</td>
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#### STAFF

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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Margaret Jefferson</td>
<td>Sr. Research Assistant</td>
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<tr>
<td>Geraldine Moore</td>
<td>Lab Assistant</td>
</tr>
<tr>
<td>Brian Morrow, B.S., M.S.</td>
<td>Biomaterials Coordinator</td>
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<tr>
<td>Iva Pendleton</td>
<td>Admin. Service Assistant</td>
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<tr>
<td>Shawn Rider</td>
<td>TMD/Sleep Disorder Clinic Coordinator</td>
</tr>
<tr>
<td>Laura Rush, B.A., M.P.H.</td>
<td>Grants and Clinical Research Manager</td>
</tr>
<tr>
<td>Colette Stewart, R.D.H., B.S., M.S.O.L.</td>
<td>Clinical Research Associate</td>
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It’s with pleasure that we announce our own Dr. George Huang, Department of Bioscience Research, is the recipient of the 2015 Distinguished Scientist Award for Pulp Biology and Regeneration Research given by the International Association for Dental Research (IADR).

Dr. Huang will be awarded $3,500 by L. D. Caulk DENTSPLY International on behalf of the IADR for his contribution to dental research. Dr. Huang will attend the March 2015 IADR Annual Meeting, in Boston, Massachusetts, where he will be presented this award in the opening ceremonies.

Dental Research News

The Distinguished Scientist Award

Dental Research News

Technology Spotlight

DektakXT™ Stylus Profiler

**Location**
Bioscience Research Center

**Description**
DektakXT™ Stylus Profiler by Bruker, Tuscon, Arizona. Contact stylus profilometer for measuring surface roughness, smoothness, and waviness.

**Applications**
The DektakXT is an advanced type of measurement interferometer (a noncontact 3D profilier). It is capable of measuring materials that have polished or rough, curved, flat or stepped surfaces.

This tenth-generation Dektak system enables the critical nanometer-level film, step and surface measurements that will power future advances in the microelectronics, semiconductor, solar, high-brightness LED, medical, scientific and materials science markets.
Dr. Daranee Versluis-Tantbirojn – Research Applicable to Restorative Dentistry

The scope of restorative dentistry includes management of dental caries and damaged tooth structures. As faculty in the Department of Restorative Dentistry, Dr. Daranee Versluis-Tantbirojn has applied her background in cariology and dental materials research to practical questions and applications in Restorative dentistry. Dr. Versluis-Tantbirojn together with Dr. Antheunis Versluis at the Biomaterials Research Laboratory (Nash Research building) has had the opportunity to work with dedicated faculty and to mentor students in her area of expertise and beyond.

Tooth erosion – from in vitro to clinical study. Loss of tooth surface from gastric acid regurgitation due to systemic conditions can be devastating to patients’ oral health. Together with Dr. Mojdeh Dehghan, Dr. Versluis-Tantbirojn studies preventive agents that have the ability to neutralize and remineralize tooth surfaces damaged by acid erosion. Summer research students Peter Stanley (2014 graduate) and Alex Fitzhugh (D4) measured surface hardening effects of preventive agents on tooth enamel. These two projects have led to publications in General Dentistry and the Journal of Cosmetic Dentistry. Drs. Dehghan and Versluis-Tantbirojn have patented a two-step mouthwash for preventing and treating tooth erosion, and completed a pilot clinical study on the effect of the proprietary mouthwash to neutralize saliva pH after an acid challenge. They received grants from the UTCOD Alumni endowment fund and their research was featured in UT Alumni magazine.

Dental caries prevention – fluoride gel and sealants. Caries prevention is especially important for pediatric dentistry. Two projects are good examples of pursuing practical research questions, one from a summer research student and another from Pediatric residents. Enamel demineralization is the first stage that can eventually develop into carious lesions. Dr. Versluis-Tantbirojn together with Dr. Ashanti Braxton supervised Latasha Garrett (2014 graduate) to investigate a short, one-minute application time of fluoride gel/foam to prevent enamel demineralization. The result of this study was published in the TDA Journal. In the other study, Dr. Martha Wells, Pediatric Dentistry faculty, wondered whether the residual cariostatic property of debonded glass ionomer sealant was due to remaining material in the deepest parts of fissures or to the inhibition of enamel demineralization. Dr. Versluis-Tantbirojn helped Drs. Natalie Smith and Kirk Morris, Pediatric Dentistry residents, design and carry out experiments to answer this question. This study is currently in press in the Nov/Dec 2014 issue of Pediatric Dentistry.
Restorative materials – cuspal flexure. Dental composites and glass-ionomers make up the majority of tooth-colored restorative materials currently used. Researchers, manufacturers, and dentists are all concerned about polymerization shrinkage of composites because it may cause undesirable clinical symptoms such as post-operative sensitivity, microleakage, and crack propagation. Although less recognized, setting reactions also cause glass-ionomers to shrink. When the material is well bonded to the tooth cavity, setting shrinkage generates enough stress to pull the cusps inward. Drs. Versluis-Tantbirojn and Antheunis Versluis have developed a unique technique to visualize and quantify cuspal flexure. Projects using this technique were carried out by summer research students and residents with help from faculty mentors, and were presented at the AADR, IADR, ADA, Hinman, and AAPD meetings. The studies have been published in Dental Materials, JADA, Pediatric Dentistry, and Operative Dentistry journals.

...and many more. Dr. Versluis-Tantbirojn facilitates research projects that give students experience and bring faculty mentors together with students to answer clinical questions relevant to their practice. Dr. Bob Hatch and Richard Sullivan (D4) determined fracture strength of glass-ionomer/composite sandwich restoration. Dr. Jim Lane and Samantha Hughey (D4) evaluated whether dentin bond strength was reduced following a delay in application of a bonding adhesive. The rationale for this latter study came from an observation in the students’ clinic that a package of adhesive may be left open for a period of time before use, which may affect the restoration performance. Other examples of practical applications is the research in Orthodontics. Nicole Powell (2014 graduate) investigated the amount of enamel lost after orthodontic bracket debonding and Cayce Connolly (D4) measured the effect of expiration dates on bracket bond strengths to answer two of Dr. Terry Trojan’s research questions. Researchers like Dr. Daranee Versluis-Tantbirojn can help with the design and execution of the projects, but meaningful research questions are best when they come from clinicians who are practicing dentistry and address practical dental issues.
The Role of Maternal & Perinatal Influences on Severe Early Childhood Caries

On Dec. 11, the Memphis AADR Section, in cooperation with the Pediatric Dentistry and Community Oral Health Department, presented a noon-time seminar by Dr. Page Caufield, Professor of Cariology and Comprehensive Care at New York University, and dental-school colleague of Dean Tim Hottel.

Dr. Caufield’s presentation was on “The Role of Maternal and Perinatal Influences on Severe Early Childhood Caries.” In this country, severe early caries is commonly associated with “Bottle Baby Syndrome,” in which a restless and perhaps undernourished infant is put to sleep with a bottle of sucrose-sweetened liquid, milk, formula or fruit juice. Prolonged contact with the fluid may damage the teeth by promoting bacterial plaque accumulation and acid production.

Dr. Caufield pointed out that a characteristic pattern of severe early caries is common in parts of the world where sucrose and baby bottles are not available but in which infant and maternal stresses including malnutrition, various diseases, and adverse birthing conditions are common. Severe early caries has not been found to result from any difference in virulence of the caries-associated bacteria. Instead, development defects in the enamel (hypoplasia) create a roughened surface penetrating into the tooth that favors bacterial colonization and destruction of the enamel matrix. A characteristic pattern of decay in a downward arc (frown) across the upper primary teeth results from enamel defects originating at the weakest point, the neonatal line.

Factors associated with severe early caries are correlated with poverty, especially the high-carbohydrate, low-protein diet common among those with poverty-related food insecurity. Dr. Caufield proposes that severe early childhood caries might be prevented at relatively low cost through better maternal nutrition in the perinatal period.

As you fill in your day-planner with all your spring events,

HINMAN DENTAL MEETING – MARCH 26-28, 2015, IN ATLANTA, GA

ALUMNI ENDOWMENT FOR RESEARCH GRANT DEADLINE
Friday, April 24th at 5:00 p.m. CST
The University of Tennessee Health Science Center College of Dentistry held its annual Student Research Day on February 19, 2015.

The day kicked off with a keynote speaker, Dr. Thomas Van Dyke, who gave a presentation to students and faculty on Inflammation and Periodontal Regeneration. Dr. Van Dyke is the Vice President for Clinical and Translational Research and Chair, Department of Periodontology at the Forsyth Institute in Cambridge Massachusetts.

He has built a distinguished career as researcher, clinician, author and editor. His research interests include modulation of inflammation by the interactions of phagocytic cells with periodontal pathogens. He is also involved in research and clinical trials of drug treatment for periodontal disease, local delivery agents, and regenerative periodontal therapies.

**Award Winners**

Cloogman Award: Emily Kymer-Davis, Yasaman Kamali, Richard Sullivan, Ammaar Abidi, Kiarash Yeganegi, Adiha Khan and Emily Toole

Stacy A. Garner Graduate Program Research Award: Dr. Amjad M. Nazzal

Dentsply Student Clinician Award: Chad Slaven

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**The SIGMA XI EXCELLENCE IN STUDENT RESEARCH AWARD**

Jessica Clower, a master’s student from the Department of Clinical Laboratory Sciences, College of Health Professions won of a Sigma Xi Excellence in Student Research Award for the outstanding project that she conducted with Dr. Yanhui Zhang and Dr. Franklin Garcia-Godoy last summer, in the Bioscience Research Center. The title of Jessica’s research was: *Real-time PCR analysis of differentially expressed genes involved in oral squamous cell carcinoma.*

The certificate with the award is presented at the College of Health Professions Convocation, where Clower graduated this past December with her master’s from the Clinical Laboratory Sciences Department. Sigma Xi, the research society,
is the world’s largest international society (by invitation) of professional scientists. It was founded in 1886 at Cornell University and has a worldwide membership of about 60,000 scientists and engineers. I am a lifetime member and have belonged for over 40 years. The Society's motto is "Companions in zealous research."

Clinical Research

Following is a list of clinical research studies conducted by UT College of Dentistry faculty in November 2014 to present. The title, investigators, and study objective are listed for each project.

**Plaque Glycolysis and Saliva Genetics – A Pilot Study**
- **Study Objective:** To improve the sensitivity of our laboratory and clinical methods used in plaque analysis and advance the prevention of oral disease including dental caries.
- **Principal Investigator:** Dr. Franklin Garcia-Godoy
- **Co-Investigators:** Dr. Yanhui Zhang and Colette Stewart
- **Research Staff:** Laura Rush

**Osteonecrosis of the Jaw (ONJ) Case Registry**
- **Study Objective:** This ONJ case registry will describe the natural history of positively-adjudicated ONJ in subjects with cancer with an observation period of five years.
- **Principal Investigator:** Dr. Cesar Migliorati
- **Research Staff:** Laura Rush

**Cranio-Facial Relationship Manipulation with an Oral Appliance Mitigating the Severity and Frequency of Motor Tics Associated with Neuro-Psychiatric Disorders such as Tourette’s Syndrome and Chronic Tic Disorder**
- **Study Objective:** To study the use of oral appliances in mitigating severity, frequency of motor and vocal tics in those with Tourette’s Syndrome and/or Chronic Tic Disorder.
- **Principal Investigator:** Dr. Timothy Hottel
- **Co-Investigators:** Dr. Robert Brandt, Dr. Martha Wells, Dr. Eliott Taynor (Long Island, NY) and Dana Watcher (Long Island, NY)
- **Research Staff:** Laura Rush
The following is a list of publications by College of Dentistry faculty from November 2014 to present, and recent as well as upcoming presentations.

**PUBLICATIONS**


Do T, Church B. Cuspal Flexure, Depth-of-cure, and Bond Integrity of Bulk-fill Composites. *Pediatric Dentistry* 2014; in press.


Branchal CF, Wells MH, Tantbirojn D, Versluis A. Can increasing the manufacturer recommended shortest curing time of high-intensity LEDs adequately cure sealants? Pediatric Dentistry 2015; in press.


The following is a list of current grants held by UT College of Dentistry faculty.

Federal/Foundation Grants

- **Stem cell-based therapy for regenerative endodontics**
  - PI: Dr. George Huang (Bioscience Research)
  - NIH/NIDCR RO1

- **Hinman Student Research Symposium**
  - PI: Dr. Franklin Garcia-Godoy
  - NIH/NIDCR (R13)

- **Plaque glycolysis analysis**
  - PI: Dr. Franklin Garcia-Godoy
  - Procter & Gamble

- **Osteonecrosis of the jaw (ONJ) case registry**
  - PI: Dr. Cesar Migliorati
  - Amgen

- **Stem cell-mediated periodontal ligament regeneration for avulsed teeth**
  - PI: Dr. George Huang
  - American Association of Endodontics

- **Advanced Nursing Education (ANE) Grant**
  - PI: Susan Patton
  - Co-I: Drs. Cesar Migliorati, Timothy Hottel, Cassandra Ballard-Holder, Margaret Hartig, and Pamela Connor
  - HRSA

- **Plaque pH analysis project**
  - PI: Dr. Franklin Garcia-Godoy
  - Procter & Gamble

- **Bioscience endodontics research**
  - PI: Dr. Franklin Garcia-Godoy

- **Colgate research**
  - PI: Dr. Franklin Garcia-Godoy
  - Colgate

- **Bioscience Research Gift**
  - PI: Dr. Franklin Garcia-Godoy
  - Procter & Gamble
• Protocol to integrate 3-D photography
  o PI: Dr. Holland Maness
  o American Association of Orthodontists Foundation

• Cranio-facial relationship manipulation with an oral appliance mitigating the severity and frequency of motor tics associated with neuro-psychiatric disorders such as Tourette Syndrome and Chronic Tic Disorder
  o PI: Dr. Timothy Hottel
  o Co-I: Drs. Robert Brandt, Martha Wells, Eliott Taynor (Long Island, NY)
  o TicTocStop

• In vitro bioactivity evaluation of three dental cements
  o PI: Dr. Franklin Garcia-Godoy
  o NuSmile

ABOUT the COLLEGE of DENTISTRY

The UTHSC College of Dentistry was founded in 1878 making it the oldest dental college in the South, and the third-oldest public college of dentistry in the United States.

The college contains a four-year dental program, totaling approximately 320 students. In addition, students in the postgraduate dental programs and Dental Hygiene are included.

The college is dedicated to providing professional, graduate, and postgraduate education; conducting dental research; and, delivering state-of-the-art patient care and public service.

The University of Tennessee is an EEO/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services.

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