

## Asst. Prof. TUĞRUL TOLGA DEMİRTAŞ

### Personal Information

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### International Researcher IDs

ORCID: 0000-0002-7806-6195

Publons / Web Of Science ResearcherID: C-9785-2015

ScopusID: 35169007300

Yoksis Researcher ID: 300149

### Education Information

Post Doctorate, Florida State University, FAMU-FSU College Of Engineering, Chemical and Biomedical Engineering, United States Of America 2022 - Continues

Doctorate, Hacettepe University, Fen Bilimleri Enstitüsü, Biyomühendislik, Turkey 2011 - 2016

Doctorate, Stanford University, School Of Medicine, Department Of Radiology Canary Cancer Detection Center, United States Of America 2014 - 2015

Postgraduate, Hacettepe University, Fen Bilimleri Enstitüsü, Biyomühendislik, Turkey 2004 - 2007

### Foreign Languages

English, C1 Advanced

### Certificates, Courses and Trainings

Health&Medicine, III. UYGULAMALI WESTERN BLOT EĞİTİMİ, İstanbul Üniversitesi, 2014

Health&Medicine, 6th Advanced Course in Cell-Material Interactions at Molecular Level, Biomaterials Laboratory INEB, 2005

Health&Medicine, HÜCRE KÜLTÜRÜ TEKNOLOJİSİNDE TEMEL PRENSİPLER VE YAPAY ORGANLAR, Ege Üniversitesi, 2004

### Dissertations

Doctorate, Kemik hasarları için vaskularize kemik doku mühendisliği: 3B biyoyazıcı ile hidrojel/hücre/biyosinyal sistemlerin hazırlanması, Hacettepe University, Fen Bilimleri Enstitüsü, Biyomühendislik A.B.D., 2016

Postgraduate, Süpergözenekli, IPN/yarı-IPN hidrojelilerin sentezi ve hücre kültürlerinde kullanımı, Hacettepe University, Fen Bilimleri Enstitüsü, Biyomühendislik A.B.D., 2007

### Research Areas

Basic Pharmaceutics Sciences, Health Sciences, Pharmacology and Therapeutics, Basic Sciences of Pharmacy, Biomedical

## Academic Titles / Tasks

Assistant Professor, Erciyes University, Eczacılık Fakültesi, Temel Eczacılık Bilimleri, 2019 - Continues

## Courses

Special Topics in Nanotechnology II, Postgraduate, 2021 - 2022  
Hücre ve Doku Mühendisliği, Doctorate, 2021 - 2022, 2020 - 2021, 2019 - 2020  
Nanoteknolojide Seçilmiş Konular II, Postgraduate, 2021 - 2022, 2020 - 2021  
3B Baskılama Teknolojileri ve İlaç Baskısı, Undergraduate, 2021 - 2022  
Special Topics in Nanotechnology, Postgraduate, 2020 - 2021  
Nanoteknolojide Seçilmiş Konular I, Postgraduate, 2020 - 2021  
Hücre ve Doku Mühendisliği, Doctorate, 2019 - 2020  
Terminoloji, Undergraduate, 2019 - 2020

## Advising Theses

Demirtaş T. T., Poli-Kromatik Led Işık Kaynağının 3-Boyutlu (3B) Biyobaskılanmış Sistemler İçindeki Pre-Osteoblast Hücrelerin Osteojenik Farklılaşmasına Etkisinin İncelenmesi, Postgraduate, M.Kaya(Student), 2022  
Demirtaş T. T., İN-SİTU ENJEKTE EDİLEBİLİR METAKRİLATLANMIŞ JELATİN (JEL-MA)- NANOİDROKSİAPATİT (nHAp) VE MEZENKİMAL KÖK HÜCRE (MSCs) SİSTEMLERİNİN KEMİK VE YUMUŞAK DOKU REKONSTRÜKSİYONUNUN İN- VİVO DİŞ ÇEKİM SOKETİ RAT MODELİNDE İNCELENMESİ, Postgraduate, Ö.Ülker(Student), 2022  
Yılmaz S., Demirtaş T. T., AKCIĞER KANSERİ HASTALARINDA KANSER KÖK HÜCRESİNİN FARKLILAŞMA POTANSİYELLERİNİN ARAŞTIRILMASI, Postgraduate, M.DOĞAN(Student), 2021

## Jury Memberships

Post Graduate, Post Graduate, Erciyes Üniversitesi, December, 2019  
Post Graduate, Post Graduate, Kahramanmaraş Sütçü İmam Üniversitesi, November, 2019  
Post Graduate, Post Graduate, Ankara Üniversitesi, September, 2019

## Published journal articles indexed by SCI, SSCI, and AHCI

- I. **Layered Fibrous Scaffolds/Membranes in Wound Healing**  
Gunyaktı A., DEMİRTAŞ T. T., KARAKEÇİLİ A.  
ELECTROSPUN POLYMERIC NANOFIBERS, pp.425-468, 2023 (SCI-Expanded)
- II. **UiO-66 metal-organic framework as a double actor in chitosan scaffolds: Antibiotic carrier and osteogenesis promoter**  
KARAKEÇİLİ A., TOPUZ B., Ersoy F. S., Sahin T., Gunyaktı A., DEMİRTAŞ T. T.  
BIOMATERIALS ADVANCES, vol.136, 2022 (SCI-Expanded)
- III. **Photobiomodulation combined with adipose-derived stem cells encapsulated in methacrylated gelatin hydrogels enhances in vivo bone regeneration**  
ÇALIŞ M., Irmak G., Demirtaş T. T., KARA M., ÜSTÜN G. G., GÜMÜŞDERELİOĞLU M., Turkkani A., Cakar A. N., Ozgur F.  
LASERS IN MEDICAL SCIENCE, vol.37, no.1, pp.595-606, 2022 (SCI-Expanded)
- IV. **Photobiomodulation with polychromatic light (600-1200 nm) improves fat graft survival by**

**increasing adipocyte viability, neovascularization, and reducing inflammation in a rat model**

Sert G., KÜÇÜKGÜVEN A., Zirh E. B., Demirtaş T. T., Çakar A. N., GÜMÜŞDERELİOĞLU M., ÇALIŞ M.  
LASERS IN SURGERY AND MEDICINE, vol.54, no.2, pp.268-280, 2022 (SCI-Expanded)

- V. **Sustained Release of Growth Factors from Photoactivated Platelet Rich Plasma (PRP).**  
Irmak G., Demirtaş T. T., Gümüşderelioğlu M.  
European journal of pharmaceutics and biopharmaceutics : official journal of Arbeitsgemeinschaft fur Pharmazeutische Verfahrenstechnik e.V, vol.148, pp.67-76, 2020 (SCI-Expanded)
- VI. **Chitosan-based double-faced barrier membrane coated with functional nanostructures and loaded with BMP-6**  
GÜMÜŞDERELİOĞLU M., Sunal E., Tolga Demirtaş T. T., KİREMİTÇİ A. S.  
Journal of Materials Science: Materials in Medicine, vol.31, no.1, 2020 (SCI-Expanded)
- VII. **Photobiomodulation with polychromatic light increases zone 4 survival of transverse rectus abdominis musculocutaneous flap**  
ÇALIŞ M., Demirtaş T. T., Sert G., Irmak G., GÜMÜŞDERELİOĞLU M., Turkkani A., Çakar A. N., Ozgur F.  
Lasers in Surgery and Medicine, vol.51, no.6, pp.538-549, 2019 (SCI-Expanded)
- VIII. **Highly Methacrylated Gelatin Bioink for Bone Tissue Engineering**  
Irmak G., Demirtaş T. T., GÜMÜŞDERELİOĞLU M.  
ACS Biomaterials Science and Engineering, vol.5, no.2, pp.831-845, 2019 (SCI-Expanded)
- IX. **Preparation of polycaprolactone/graphene oxide scaffolds: A green route combining supercritical CO2 technology and porogen leaching**  
Yıldırım S., Demirtaş T. T., Dinçer C. A., Yıldız N., Karakeçili A.  
Journal of Supercritical Fluids, vol.133, pp.156-162, 2018 (SCI-Expanded)
- X. **A Biomimetic Alternative to Synthetic Hydroxyapatite: "Boron-Containing Bone-Like Hydroxyapatite" Precipitated From Simulated Body Fluid**  
ÇALIŞ M., Demirtaş T. T., VATANSEVER A., IRMAK G., SAKARYA A. H., ATILLA P., OZGUR F., GUMUŞDERELIOGLU M.  
Annals of plastic surgery, vol.79, no.3, pp.304-311, 2017 (SCI-Expanded)
- XI. **A bioprintable form of chitosan hydrogel for bone tissue engineering**  
Demirtaş T. T., Irmak G., GÜMÜŞDERELİOĞLU M.  
BIOFABRICATION, vol.9, no.3, 2017 (SCI-Expanded)
- XII. **Microwave-induced production of boron-doped HAp (B-HAp) and B-HAp coated composite scaffolds**  
TUNCAY E., Demirtaş T. T., GÜMÜŞDERELİOĞLU M.  
Journal of Trace Elements in Medicine and Biology, vol.40, pp.72-81, 2017 (SCI-Expanded)
- XIII. **Microwave-induced biomimetic approach for hydroxyapatite coatings of chitosan scaffolds**  
Kaynak Bayrak G., Demirtaş T. T., GÜMÜŞDERELİOĞLU M.  
Carbohydrate Polymers, vol.157, pp.803-813, 2017 (SCI-Expanded)
- XIV. **Multi-layered functional membranes for periodontal regeneration: Preparation and characterization**  
Gürbüz S., Demirtaş T. T., Yüksel E., Karakeçili A., Doğan A., GÜMÜŞDERELİOĞLU M.  
Materials Letters, vol.178, pp.256-259, 2016 (SCI-Expanded)
- XV. **Preparation of bioactive and antimicrobial PLGA membranes by magainin II/EGF functionalization**  
Yüksel E., Karakeçili A., Demirtaş T. T., GÜMÜŞDERELİOĞLU M.  
International Journal of Biological Macromolecules, vol.86, pp.162-168, 2016 (SCI-Expanded)
- XVI. **A Bio-Acoustic Levitational (BAL) Assembly Method for Engineering of Multilayered, 3D Brain-Like Constructs, Using Human Embryonic Stem Cell Derived Neuro-Progenitors**  
Bouyer C., CHEN P., Güven S., Demirtaş T. T., NIELAND T. J. F., Padilla F., Demirci U.  
Advanced Materials, vol.28, no.1, pp.161-167, 2016 (SCI-Expanded)
- XVII. **Combined delivery of PDGF-BB and BMP-6 for enhanced osteoblastic differentiation**  
Demirtaş T. T., Göz E., Karakeçili A., GÜMÜŞDERELİOĞLU M.  
Journal of Materials Science: Materials in Medicine, vol.27, no.1, pp.1-11, 2016 (SCI-Expanded)
- XVIII. **Microwave-assisted fabrication of chitosan-hydroxyapatite superporous hydrogel composites as bone scaffolds**  
Beşkardeş I. G., Demirtaş T. T., Durukan M. D., GÜMÜŞDERELİOĞLU M.

- Journal of Tissue Engineering and Regenerative Medicine, vol.9, no.11, pp.1233-1246, 2015 (SCI-Expanded)
- XXIX. **Encapsulated boron as an osteoinductive agent for bone scaffolds**  
GÜMÜŞDERELİOĞLU M., TUNCAY E., Kaynak G., Demirtaş T. T., Aydın S. T., Hakki S. S.  
Journal of Trace Elements in Medicine and Biology, vol.31, pp.120-128, 2015 (SCI-Expanded)
- XX. **Bone-like hydroxyapatite precipitated from 10×SBF-like solution by microwave irradiation**  
Demirtaş T. T., Kaynak G., Gumuşderelioğlu M.  
Materials Science and Engineering C, vol.49, pp.713-719, 2015 (SCI-Expanded)
- XXI. **Bone regeneration by pHEMA/gelatin cryogel based scaffolds, AdMSCs and controlled release of steroid hormones: in vitro and in vivo studies**  
Perver D., Irmak G., Akbay E., Demirtaş T. T., Ozdil A. M. A., GÜMÜŞDERELİOĞLU M., ONUR M. A., DENİZLİ A.  
JOURNAL OF TISSUE ENGINEERING AND REGENERATIVE MEDICINE, vol.8, pp.260-261, 2014 (SCI-Expanded)
- XXII. **Development of boron-doped tissue scaffolds for bone regeneration**  
GÜMÜŞDERELİOĞLU M., TUNCAY E., Kaynak G., Demirtaş T. T., Aydın R. S. T., Hakki S. S.  
JOURNAL OF TISSUE ENGINEERING AND REGENERATIVE MEDICINE, vol.8, pp.509-510, 2014 (SCI-Expanded)
- XXIII. **Estrogen as a Novel Agent for Induction of Adipose-Derived Mesenchymal Stem Cells for Osteogenic Differentiation: In Vivo Bone Tissue-Engineering Study**  
Calis M., Demirtaş T. T., Atilla P., Tatar I., Ersoy O., Irmak G., Celik H. H., Cakar A. N., Gumusderelioglu M., Ozgur F.  
PLASTIC AND RECONSTRUCTIVE SURGERY, vol.133, no.4, 2014 (SCI-Expanded)
- XXIV. **Sustained release of 17β-estradiol stimulates osteogenic differentiation of adipose tissue-derived mesenchymal stem cells on chitosan-hydroxyapatite scaffolds**  
Irmak G., Demirtaş T. T., Altındal D. Ç., ÇALIŞ M., GÜMÜŞDERELİOĞLU M.  
Cells Tissues Organs, vol.199, no.1, pp.37-50, 2014 (SCI-Expanded)
- XXV. **Superporous polyacrylate/chitosan IPN hydrogels for protein delivery**  
GÜMÜŞDERELİOĞLU M., Erce D., Demirtaş T. T.  
Journal of Materials Science: Materials in Medicine, vol.22, no.11, pp.2467-2475, 2011 (SCI-Expanded)
- XXVI. **Osteogenic activities of MC3T3-E1 cells on heparin-immobilized poly(caprolactone) membranes**  
Gumusdereliolu M., Karakeçili A., Demirtaş T. T.  
Journal of Bioactive and Compatible Polymers, vol.26, no.3, pp.257-269, 2011 (SCI-Expanded)
- XXVII. **Synthesis, characterization and osteoblastic activity of polycaprolactone nanofibers coated with biomimetic calcium phosphate**  
MAVIŞ B., Demirtaş T. T., GÜMÜŞDERELİOĞLU M., Gunduz G., Colak U.  
ACTA BIOMATERIALIA, vol.5, no.8, pp.3098-3111, 2009 (SCI-Expanded)
- XXVIII. **Hydroxyapatite containing superporous hydrogel composites: Synthesis and in-vitro characterization**  
Tolga Demirtaş T. T., Karakeçili A. G., GÜMÜŞDERELİOĞLU M.  
Journal of Materials Science: Materials in Medicine, vol.19, no.2, pp.729-735, 2008 (SCI-Expanded)
- XXIX. **Evaluation of L929 fibroblast attachment and proliferation on Arg-Gly-Asp-Ser (RGDS)-Immobilized chitosan in serum-containing/serum-free cultures**  
KARAKEÇİLİ A. G., Demirtaş T. T., SATRIANO C., GUEMUESDERELIOGLU M., MARLETTA G.  
JOURNAL OF BIOSCIENCE AND BIOENGINEERING, vol.104, no.1, pp.69-77, 2007 (SCI-Expanded)

## Articles Published in Other Journals

- I. **Gen Tedavisi, Biyoyazıcılar ve Doku Mühendisliğinde Geleceğe Yönelik Yaklaşımlar Kök Hücre ve Doku Mühendisliği Özel Sayısı**  
DEMİRTAŞ T. T., Karakeçili A.  
Türkiye Klinikleri Plastic Surgery - Special Topics, vol.4, no.3, pp.77-82, 2015 (Peer-Reviewed Journal)
- II. **Klinisyenler İçin Doku Mühendisliği Konsepti, Doku İskelesi Fabrikasyon Teknikleri Kök Hücre ve Doku Mühendisliği Özel Sayısı**  
Karakeçili A., DEMİRTAŞ T. T.

## Books & Book Chapters

### I. Layered Fibrous Scaffolds/Membranes in Wound Healing

Günyaktı A., Demirtaş T. T., Karakeçili A.

in: Advances in Polymer Science, Akihiro AbeAnn-Christine AlbertssonGeoffrey W CoatesJan GenzerShiro KobayashiKwang-Sup LeeLudwik LeiblerTimothy E. LongMartin MöllerOguz OkayVirgil PercecBen Zhong TangEugene M. TerentjevPatrick TheatoBrigitte VoitUlrich WiesnerXi Zhang, Editor, Springer, London/Berlin , Berlin, pp.1-44, 2022

## Refereed Congress / Symposium Publications in Proceedings

### I. Natural Bio-Inks for 3D Bioprinting of Cancer Tumor Models

DEMİRTAŞ T. T.

The 3rd International conference on Natural Products for Cancer Prevention and Therapy, Kayseri, Turkey, 18 - 20 December 2019, vol.40

### II. 3D BIOPRINTING OF SPHEROIDS FOR NEURAL TISSUE MODELS

DEMİRTAŞ T. T.

GEVHER NESİBE4. ULUSLARARASI SAĞLIK BİLİMLERİ KONGRESİ, Ankara, Turkey, 23 - 24 November 2019

### III. BIOPRINTED 3D CANCER TUMOR MODELS FORPERSONALIZED THERAPHY

DEMİRTAŞ T. T., YILMAZ S.

24th International Biomedical Science and Technology Symposium, İzmir, Turkey, 17 - 20 October 2019

### IV. Amoxicillin releasing shape memory hydrogel as a novel tissue expander

IRMAK G., DEMİRTAŞ T. T., Shahirdavarpanah S., GÜMÜŞDERELİOĞLU M.

22nd Biomedical Science and Technology Symposium, 12 - 14 May 2017

### V. Engineered chitosan as a bio-ink for 3D bioprinting

DEMİRTAŞ T. T., IRMAK G., GÜMÜŞDERELİOĞLU M.

22nd Biomedical Science and Technology Symposium, 12 - 14 May 2017

## Supported Projects

ERTAŞ Y. N., KARASU S. N., DEMİRTAŞ T. T., Project Supported by Higher Education Institutions, Doku Mühendisliği Uygulamaları İçin Yeni Bir Hidrojel Sistemin Üretimi Chia Tohumu Müsilajının Mikrodalga Destekli Metakrilasyonu, 2022 - 2023

DEMİRTAŞ T. T., ÜLKER Ö., Project Supported by Higher Education Institutions, İNSİTU ENJEKTE EDİLEBİLİR METAKRİLATLANMIŞ JELATİN JELMA NANOİDROKSİAPATİT nHAp VE MEZENKİMAL KÖK HÜCRE MSCs SİSTEMLERİNİN KEMİK VE YUMUŞAK DOKU REKONSTRÜKSİYONUNUN İNVİVO DİŞ ÇEKİM SOKETİ RAT MODELİNDE İNCELENMESİ, 2021 - 2022

YILMAZ S., DOĞAN M., DEMİRTAŞ T. T., Project Supported by Higher Education Institutions, Akciğer Kanseri Hastalarında Kanser Kök Hücrelerinin Farklılaşma Potansiyellerinin Araştırılması, 2020 - 2021

Demirtaş T. T., Çalış M., Gümüşderelioğlu M., Project Supported by Higher Education Institutions, Ratlarda yağ grefti uygulaması öncesi ve sonrasında yapılacak fototerapi uygulamasının greft yaşamsallığına katkısı, 2019 - 2020

Demirtaş T. T., Gümüşderelioğlu M., Project Supported by Higher Education Institutions, Periodontitis tedavisinde kullanılan bir bariyer membran ve üretim yöntemi, 2016 - 2020

Demirtaş T. T., Gümüşderelioğlu M., Project Supported by Higher Education Institutions, Bir doku genişletici ve üretim yöntemi, 2016 - 2020

Demirtaş T. T., Özgür F. F., Çalış M., Gümüşderelioğlu M., Project Supported by Higher Education Institutions,

Metakrilatlanmış jelatin hidrojel ve adipöz kök hücre sistemlerinde fototerapi etkisiyle kraniyel kemik defektlerinin rekonstrüksiyonunun in vivo rat modelinde incelenmesi, 2017 - 2019

Demirtaş T. T., Çalış M., Project Supported by Higher Education Institutions, Fototerapinin pediküllü transvers rektus abdominis kas deri flebinin zone 4 yaşamsallığına etkisinin değerlendirilmesi, 2017 - 2018

Demirtaş T. T., Gerçek Beşkardeş I., Project Supported by Higher Education Institutions, 3 Boyutlu Biyoyazıcı ile Oluşturulan Hidrojellerde Hücre Canlılığının Proses Değişkenleri ile İlişkilendirilmesi, 2017 - 2018

Gümüşderelioğlu M., TUBITAK Project, Mikrodalga-Desteği İle Biyomimetik Hidroksiapatit (Hap)/Bor-Katkılı Hap Oluşumu Ve Kitosan-Hap Kemik Doku İskelelerinin Geliştirilmesi, 2013 - 2015

Akman A. C., Nohutcu R. M., TUBITAK Project, Nell-1'in Periodontal Hücrelerin Rejeneratif Potansiyelleri Üzerindeki Etkilerinin Belirlenmesi ve Periodontal Doku Mühendisliğinde Nell-1 Yüklü Kitosan-Aljinat Yapılı Doku İskelelerinin Kullanılması, 2011 - 2014

Gümüşderelioğlu M., TUBITAK Project, Bmp-6 Yüklü Aljinat Mikroküreler İçeren Kitosan Doku İskeleleri İle Periodontal Doku Rejenerasyonu, 2010 - 2011

## Patent

Demirtaş T. T., BİR DOKU GENİŞLETİCİ VE ÜRETİM YÖNTEMİ, Patent, CHAPTER A Human Needs, The Invention Registration Number: TR 2016 14282 B , Standard Registration, 2022

Demirtaş T. T., Bir hap (hidroksiapatit)/bor katkılı hap üretimi ve kompozit doku iskeleleri geliştirilmesine ilişkin bir yöntem., Patent, CHAPTER A Human Needs, The Invention Registration Number: 2014 02109 , Standard Registration, 2019

Demirtaş T. T., Periodontitis tedavisinde kullanılan bir bariyer membran ve üretim yöntemi, Patent, CHAPTER A Human Needs, The Invention Registration Number: TR 2015 0680 B , Standard Registration, 2018

Demirtaş T. T., Barrier membrane used in periodontitis treatment and a production method thereof , Patent, CHAPTER A Human Needs, The Invention Recourse Number: US20180161478A1 , Standard Registration, 2018

Demirtaş T. T., Gümüşderelioğlu M., A TISSUE EXPANDER AND A PRODUCTION METHOD THEREOF, Patent, CHAPTER A Human Needs, The Invention Recourse Number: TR2017/000100 , Standard Registration, 2016

Demirtaş T. T., Gümüşderelioğlu M., A METHOD FOR PRODUCING A HAP (HYDROXYAPATITE)/BORON- DOPED HAP AND DEVELOPING COMPOSITE TISSUE SCAFFOLDS, Patent, CHAPTER A Human Needs, The Invention Recourse Number: TR2015/000065 , Standard Registration, 2015

## Activities in Scientific Journals

Kardiyovasküler Cerrahi/Dergi-KVC, Committee Member, 2013 - Continues

## Memberships / Tasks in Scientific Organizations

Biomaterials and Tissue Engineering Society, Member, 2016 - Continues

## Scientific Refereeing

BIOFABRICATION, Journal Indexed in SCI-E, February 2021

Biofabrication, Journal Indexed in SCI-E, March 2020

Carbohydrate Polymers, SCI Journal, January 2014

Materials Science and Engineering: C, SCI Journal, January 2013

Journal of Tissue Engineering and Regenerative Medicine, SCI Journal, January 2012

## **Metrics**

Publication: 43

Citation (WoS): 822

Citation (Scopus): 1067

H-Index (WoS): 16

H-Index (Scopus): 17

## **Congress and Symposium Activities**

International Aegean Conferences-VI, Attendee, İzmir, Turkey, 2022

Mediterranean International Conference on Research in Applied Sciences, Attendee, Antalya, Turkey, 2022

Biomed2019 24th International Biomedical Science and Technology Symposium/ Bioprinted 3D Cancer Tumor Models for Personalized Therapy, Working Group, İzmir, Turkey, 2019

## **Scholarships**

2211-C Öncelikli Alanlara Yönelik Yurt İçi Doktora Burs Programı, TUBITAK, 2013 - 2016

2214-A Yurt Dışı Araştırma Burs Programı (Doktora öğrencileri için), TUBITAK, 2010 - 2015

## **Non Academic Experience**

FAMU-FSU College of Engineering Department of Chemical and Biomedical Engineering, National High Magnetic Field Laboratory

Stanford Üniversitesi Tıp Fakültesi