

### **Historical List of Texas Tech University**

### **Outstanding Thesis and Dissertation Award Recipients**

#### 2022

1st Place	Dr. Christian Dieling	Department of Industrial,	Techniques for Calibration of Hailpad Material
Dissertation		Manufacturing & Systems	
		Engineering	
	Major Advisor: I	Dr. Mario Beruvides	
2nd Place	Dr. Sevgi Arca	Department of Computer Science	Protecting Data Privacy with Anonymity: Quantifying Instinctive
Dissertation			Measures and Intelligent Effective Search for Optimal Anonymized Data
	Major Advisor: [	r. Rattikorn Hewett	
1st Place Thesis	Owen Smith	Department of Geosciences	Mineral Origin and Siderite Cementation Processes in the Missourian
			Clastic Rocks of the Anadarko Basin, OK
	Major Advisor: I	Dr. Branimir Sevgic	
2nd Place Thesis	Jacob Young	Department of Electrical and	An Experimental Apparatus and Diagnostics for the Study of Vacuum
		Computer Engineering	Surface Flashover
	Major Advisor: [	r. Jacob Stephenson	

1st Place		Department of Personal Financial	Three Essays Examining the Financial Wellbeing of Older Americans
Dissertation	Dr. Olamide Olajide	Planning	Tillee Essays Examining the Financial Wellbeing of Older Americans
	Major Advisor: Dr. Sarah	n Asebedo	
2nd Place		Department of Curriculum &	"Fanfiction: Adult literacy impressions
Dissertation	Dr. Cari Carter	Instruction	and the influence of fandom on educational practices"
	Major Advisor: Dr. Melli	nee Lesley	
			The Effects of Domestic and Trade Policy Interventions on Global
		Department of Agriculture & Applied	Agricultural Trade
1st Place Thesis	Nathan Holtman	Economics	ŭ
	Major Advisor: Dr. Steph	nen Devadoss	
			Is Sustainable Positioning the New Path to Achieve Brand Loyalty? An
		Department of Hospitality & Retail	Investigation on the Gen Z Market of the U.S. Apparel Brands
2nd Place Thesis	Khirul B. Mim	Management	6
	Major Advisor: Dr. Tun-N	Min Jai	

### 2021

1st Place	Dr. Kalhara		Mechanisms Linking the Adipocyte Renin Angiotensin System (RAS) to
Dissertation	Menikdiwela	<b>Department of Nutritional Sciences</b>	Obesity, Inflammation and Endoplasmic Reticulum Stress
	Major Advisor: Dr. Naim	na Moustaid-Moussa	
2nd Place	Dr. Armando	Department of Environmental	Sorption, Uptake, Trophic Transfer and Immunotoxicity of Microplastics
Dissertation	Elizalde-Velazquez	Toxicology	and Nanoplastics in the Aquatic Environment
	Major Advisor: Dr. Jaclyn Canas		
		Department of Wildlife, Aquatic, &	Population Trends and Connectivity of Snowy Plovers on the Southern
1st Place Thesis	Kristen Heath	Wildlands Science Management	Great Plains of Texas, New Mexico and Oklahoma
	Major Advisor: Dr. Warr	ren Conway	

2nd Place Thesis	Courtney Ramsey	Department of Wildlife, Aquatic, & Wildlands Science Management	Pronghorn Fawn Survival, Bed-Site Characteristics, and Adult Doe Habitat Selection in Southeastern New Mexico
	Major Advisor: Dr. Warr	en Conway	

1st Place Dissertation	Dr. Jonathan Verbeten	Department of Music	"Trashy Music" in the Halls: A Cultural-Geographical History of Music Making in San Francisco During the Gold Rush Years (1849-1869)
	Major Advisor: Dr. Chris	topher Smith	
2nd Place			
Dissertation	Dr. Leah Heilig	Department of English	Ways to Move, Ways to Map: Neurodiversity in Interaction Design
	Major Advisor: Dr. Michael Faris		
1st Place Thesis	Alexander Claman	Department of Classical & Modern Languages & Literatures	Toward a Morphic History of Landscape
	Major Advisor: Dr. Chris	topher Witmore	

### 2020

1st Place			Allergen-free Pollen Shell as a Novel Biomaterial for Oral Vaccine Delivery: Development, Characterization, In Vivo Efficacy, and
Dissertation	Dr. Md Jasim Uddin	Department of Chemical Engineering	Mechanistic Insight
	Major Advisor: Dr. Harvi	nder Gill	
2nd Place Dissertation	<b>Dr. Yeqin Wang</b> Major Advisor: Dr. Beibei Ren	Department of Wind Science & Engineering	Control of Power Electronic Converters for Microgrids

1st Place Thesis	Yves Tchatchoua	Department of Electrical & Computer Engineering	Software Defined Radio (SDR) based Non-Contact Vital Signs (NCVS) Sensor System
	Major Advisor: Dr. Yu-Ch	nun Donald Lie	

1st Place Dissertation	Dr. Cary Oldham	Department of Human Development & Family Studies	A Longitudinal Study of the Timing of First Sex in Romantic Relationships and Subsequent Relationship Quality
	Major Advisor: Dr. Sylvi	a Niehuis	
2nd Place Dissertation	Dr. Cara Lawson	Department of Agricultural Education & Communication	The Media's Influence on Public Perceptions and Attitudes Toward the Rural Opioid Epidemic
	Major Advisor: Dr. Cour	tney Meyers	
1st Place Thesis	Ethan Sabala	Department of Agricultural & Applied Economics	Essays in Trade Policy Analysis: Chinese Tariffs on US Agricultural Markets
	Major Advisor: Dr. Step	hen Devadoss	

### 2019

1st Place Dissertation	Dr. Kembra Albracht- Schulte	Department of Nutritional Sciences	Hepatoprotective Mechanisms of Eicosapentaenoic Acid in High-Fat Fed Mice and Identification of Biomarkers for Non-Alcoholic Fatty Liver Disease in Humans
	Major Advisor: Dr. Naima Mo	ustaid-Moussa	
2nd Place	Dr. Vimal Kumar		Understanding the Genetic factors involved in Cell wall biosynthesis
Dissertation	Balasubramanian	Department of Plant & Soil Science	and Biomass production.
	Major Advisor: Dr. Venugopa	l Mendu	
			Cotton yield variability in relation to irrigation rates, soil physical
1st Place Thesis	Jasmine Neupane	Department of Plant & Soil Science	properties and topography

Major Advisor: Dr. Wenxuan Guo			
			Regional Surveillance and Seasonal Variation of Eyeworm
			(Oxyspirura petrowi) and Caecal Worm (Aulonocephalus pennula)
		Department of Environmental	Infection in Northern Bobwhite Quail (Colinus virginianus) of Rolling
2nd Place Thesis	Kendall Blanchard	Toxicology	Plains, TX
	Major Advisor: Dr. Ron Kendall		

1st Place			Marian Devotion in Music: Three Settings of the Ave Maris Stella by Selected Composers at the Santissima Annunziata, Florence (1700-1900
Dissertation	<b>Dr. Candice Holley</b>	Department of Music	A.D.)
	Major Advisor: Dr. Ange	ela Mariani Smith	
2nd Place			Dilataga, Daams
Dissertation	Dr. Brian Larsen	Department of English	Pilotage: Poems
	Major Advisor: Dr. Willi	am Wenthe	
			Spices, the East India Company, and the Origins of Anti-Dutch Sentiment
1st Place Thesis	<b>Heather Turbeville</b>	Department of History	in England in the Sixteenth and Seventeenth Centuries
	Major Advisor: Dr. Abig	ail Swingen	

### 2018

1st Place Dissertation	Dr. Molla Hasan	Department of Mechanical Engineering	Decoupling the Effects of Surface Roughness and Chemistry on the wetting of Metallic Glasses
	Major Advisor: Dr. Gold	en Kumar	
2nd Place		Department of Mathematics &	Fluid-Structure Interaction Simulations for Medical Applications
Dissertation	Dr. Sara Calandrini	Statistics	Fidia Structure interaction simulations for Medical Applications
	Major Advisor: Dr. Euge	enio Aulisa	

1st Place		Department of Agricultural & Self-Regulation in the U.S. Pharmaceutical Market	
Dissertation	Dr. Raymond March	Applied Economics	Sen-Regulation in the O.S. Pharmaceutical Market
	Major Advisor: Dr. Adan	n Martin	
2nd Place	Dr. Gail Alleyne	Department of Instructional	Effects of Online Course Design Elements on Undergraduate Students'
Dissertation	<b>Bayne</b> Major Advisor: Dr. Fethi Inan	Technology	Mental Fatigue
1st Place Thesis	<b>Alyssa Bonorden</b> Major Advisor: Dr. Brett Houk	Department of Anthropology	Comparing Colonial Experiences in Northwestern Belize: Archaeological Evidence from Qualm Hill Camp and Kaxil Uinic Village

#### 2017

# **Humanities/Fine Arts**

1st Place			Negotiating the Supermarket: A Critical Approach to Nutrition Literacy
Dissertation	Dr. Joy McMurrin	Department of English	Among Low-income Consumers
	Major Advisor: Dr. Sam D	ragga	
2nd Place		Department of Communication	An Unhealthy Drama: A Burkean Analysis of Mental Illness Rhetorics
Dissertation	Dr. Jeannie Bennett	Studies	All Officeattly Diama. A Burkean Analysis of Mental Illiess Kiletonics
	Major Advisor: Dr. Amy		
	Koerber		
1st Place Thesis	<b>Garret McDonald</b>	Department of History	Prisoners at War: Soviet Forced Labor and the Second World War
	Major Advisor: Dr. Alan B	arenberg	
			Performing Masculine Perfection: Eugen Sandow's American Male
2nd Place Thesis	Aaron Wood	Department of Theatre & Dance	Ideal
	Major Advisor: Dr. Dorotl	ny Chansky	

# **Biological Life Sciences**

1st Place		Department of Nutritional	Cellular and Molecular Basis for Omega 3 Polyunsaturated Fatty
Dissertation	Dr. Mandana Pahlavani	Sciences	Acid Regulation of Brown Adipose Tissue
	Major Advisor: Dr. Naima Mo	ustaid-Moussa	
2nd Place Dissertation	<b>Dr. Amanda Cano</b> Major Advisor: Dr. Jaclyn Canas-Carrell	Department of Environmental Toxicology	Determination of carbon-based nanomaterial distribution, toxicity, and trophic transfer in aquatic environments
1st Place Thesis	Hannah Ashbaugh	Department of Natural Resources Management	Environmental availability and potential influences of heavy metals on snowy plovers in the Southern Great Plains of Texas, New Mexico, and Oklahoma
	Major Advisor: Dr. Warren Co	nway	

### 2016

1st Place		Department of Civil &	Extreme response and fatigue damage analysis of wind-excited
Dissertation	Dr. Jie Ding	<b>Environmental Engineering</b>	structures considering non-Gaussian load effects
	Major Advisor: Dr. Xinzł	nong Chen	
2nd Place			Cubaranasa Caguritu I Isa Kayatraka Dunamias
Dissertation	Dr. Alaa Darabseh	Department of Computer Science	Cyberspace Security Use Keystroke Dynamics
	Major Advisor: Dr.		
	Akbar Namin		
		Department of Electrical &	The Design of a Robust and Intelligent Phased Array Non-Contact Vital
1st Place Thesis	Travis Hall	Computer Engineering	Signs (NCVS) Sensor System
	Major Advisor: Dr. Yu Chon Donald Lie		
		Department of Natural Resources	The role of isolation in Sonoran Desert water site connectivity-based
2nd Place Thesis	Travis Hall	Management	conservation strategies
	Major Advisor: Dr. Kerry	y Griffis-Kyle	

1st Place Dissertation	Dr. Sungwon Chung	Department of Educational Psychology & Learning	An Investigation of the Effects of Emotional Visual Aids on Learning Performance and Mental Effort in Online Health Education
Dissertation	•		Terrormance and Mental Errore in Online Health Education
	Major Advisor: Dr. Jong	oil Cheon	
2nd Place Dissertation	<b>Dr. Paulina Velez- Gomez</b> Major Advisor: Dr.	Department of Human Development & Family Studies	Identity Negotiations of Colombian International Students
	Nancy Bell		
		Department of Sociology,	Identity & Ambiguity: The Moral Career of Undocumented Young Adults
1st Place Thesis	Girsea Martinez	Anthropology & Social Work	from Mixed-Status Immigrant Families
	Major Advisor: Dr. Jenn	fer Dunn	
2nd Place Thesis	Kenna Neitch	Department of English	The Nature of Satire: Essentialism, Gender, and Purpose
	Major Advisor: Dr. Kerry	Griffis-Kyle	

#### 2015

1st Place			Estimation of soil moisture status in the Texas High Plains using
Dissertation	Dr. Sanaz Shafian	Department of Plant & Soil Science	remote sensing.
	Major Advisor: Dr. Steph	en Maas	
2nd Place	Dr. Matthew	Department of Natural Resources	Environmental Factors Regulating Toxic Blooms of Golden Algae
Dissertation	VanLandeghem	Management	(Prymnesium Parvum) and their Effects on Fisheries Resources
	Major Advisor: Dr.	G	
	Reynaldo Patino		
			Characterization of Soils via Portable X-ray Fluorescence
1st Place Thesis	Aakriti Sharma	Department of Plant & Soil Science	Spectrometer
	Major Advisor: Dr. David	Weindorf	
		Department of Animal & Food	A Novel and Inexpensive Semen Thawing Device Designed to Improve
2nd Place Thesis	<b>Cody Sultenfuss</b>	Sciences	Efficiency in a Production Agriculture Environment
	Major Advisor: Dr. Samu	el Prien	

1st Place			Baptizing the Dead: Creative Nonfiction Essays
Dissertation	Dr. Michael Palmer	Department of English	Baptizing the Dead. Creative Normction Essays
	Major Advisor: Dr. Dennis	Covington	
2nd Place Dissertation	Dr. Heath Wing	Department of Classical & Modern Languages	States of Exception on American Frontiers: Biopolitics, Violence, and Nation in Martin Fierro, Os Sertaes, and Blood Meridian.
	Major Advisor: Dr. John Beusterien		
1st Place Thesis	Tiffany Gonzalez	Department of History	Chicana Politics: Maria Cardenas and La Raza Unida Party, 1935-1993
	Major Advisor: Dr. Julie Wi	llett	

### 2014

1st Place Dissertation	Dr. Yunzhe Ma	Department of Chemical Engineering	Microneedles for Drug Delivery into Oral Cavity
	Major Advisor: Dr. Harv	vinder Gill	
2nd Place		Department of Mechanical	Investigating the onset of slip in gait by employing probabilistic theory
Dissertation	Dr. Jared Gragg	Engineering	and optimization-based motion prediction
	Major Advisor: Dr.		
	Jingzhou Yang		
1st Place Thesis	Jason Post	Department of Geosciences	Environmental Inequality in Lubbock Texas
	Major Advisor: Dr. Perr	y Carter	

1st Place			Interactions in Kindergarten Writing Workshop: Writing
Dissertation	Dr. Leah Carruth	Department of Education	Development and Social Development
	Major Advisor: Dr. Carole	Janisch	
			Motivated cognition in video games: the influence of emotional
2nd Place			video game content on cognitive processing of billboard
Dissertation	Dr. Sungwon Jung	Department of Education	advertisements embedded in first-person shooter games
	Major Advisor: Dr. Todd		
	Chambers		
			A Quantitative Analysis of Factors Affecting Undergraduate
		Department of Education,	Business Students' Choice of Major: Testing a Proposed Model of
1st Place Thesis	Megan Ohlmann	Psychology, & Leadership	Academic Major Choice Identity Development.
	Major Advisor: Dr. Stephanie Jones		
		Department of Agricultural	A Social Network Analysis of Texas Alliance for Water
2nd Place Thesis	Nellie Hill	Education and Communications	Conservation Producers
	Major Advisor: Dr. David D	oerfert	

### 2013

			Toxicity of cadmium quantum dots compared to cadmium and
1st Place		Department of Environmental	zinc ions in zebrafish (Danio rerio) and water flea (Daphnia
Dissertation	Dr. Song Tang	Toxicology	pulex)
	Major Advisor: Dr. Greg Mayer		
2nd Place		Department of Biological	Molecular responses of Batrachochytrium dendrobatidis
Dissertation	Dr. Jose Thekkiniath	Sciences	following exposure to thyroid hormone
	Major Advisor: Dr. Michael San		
	Francisco		

1st Place Thesis	Rebecca Perkins Major Advisor: Dr. Clint Boal	Department of Natural Resource Management	Anti-predatory Behavior of Northern Bobwhite in the Rolling Plains of Texas
2nd Place Thesis	Komal Kunder	Graduate School	Molecular Landscape of Cotton Fibers in Early Elongation
	Major Advisor: Dr. Susan San F	Franscisco	

1st Place	Dr. Henrietta		Hungry Moon (Dooms)
Dissertation	Goodman	Department of English	Hungry Moon (Poems)
	Major Advisor: Dr. Greg N	Mayer	
2nd Place Dissertation	<b>Dr. Dorothy Maria O'Connell</b> Major Advisor: Dr. Sara Spurgeon	Department of English	Them Boys Just Ain't Right: Masculinity, Myth, and Social Systemic Communication in Cormac McCarthy's Novels
1st Place Thesis	Justin Kirkland	Department of History	From Rite to Right: How Holy Days Became A Natural Right in Medieval England
	Major Advisor: Dr. Abigai	l Swingen	

### 2012

#### **Social Sciences**

1st Place		Department of Educational	Physical Activity and Self-regulatory Capabilities: Examining
Dissertation	Dr. Nicole Gilinsky	Psychology	Relationships with Academic Self-efficacy and Academic Outcomes
	Major Advisor: Dr. Hans	el Burley	
2nd Place		Department of Human	Woman's Countar Narratives of Radomation
Dissertation	Dr. Matthew Russell	Development and Family Studies	Women's Counter Narratives of Redemption
	Major Advisor: Dr.		
	Nancy Bell		

1st Place Thesis	Shawn Brackett Major Advisor: Dr. Stac	Department of Higher Education cy Jacob	Advancing Women in Education: Colorado State Normal School and the University of Colorado, 1870-1920
		Department of Marriage and Family	The association between the experience of abuse in childhood and
2nd Place Thesis	Josh Novak	Therapy	perceptions of safety in current adult intimate relationships
	Major Advisor: Dr. Dou	iglas Smith	

1st Place		Department of Chemical	An Analysis of Model Parameter Uncertainty on Online Model-based
Dissertation	Dr. Yingying Chen	Engineering	Applications
	Major Advisor: Dr. Karle	ene Hoo	
2nd Place		Department of Mathematics and	On the Integration of Elementary Functions: Computing the
Dissertation	Dr. Brian Miller	Statistics	Logarithmic Part
	Major Advisor: Dr. Lourdes Juan		
		Department of Mathematics and	Vt
1st Place Thesis	<b>Kristine Seaman</b>	Statistics	Kryptos
	Major Advisor: Dr. Mar	a Neusel	
	Valiantsina	Department of Mathematics and	Orbit Charn Classes in Invariant Theory
2nd Place Thesis	Laurushchyk	Statistics	Orbit Chern Classes in Invariant Theory
	Major Advisor: Dr. Mar	a Neusel	

### 2011

# **Biological Life Sciences**

1st Place Dissertation	Dr. Adcharee Karnjanapiboonwong	Department of Environmental Toxicology	Long-Term Fate of Pharmaceuticals and Personal Care Products in the Environment
Dissertation	Major Advisor: Dr. Todd A	· ·	the Limitoninent
2nd Place	Iviajoi Auvisoi. Di. Todu A	Allueisuli	Soil Microbial Responses to Increased Precipitation in the Desert
	Dr. Colin Bell	Department of Biological Calonson	Grasslands of Big Bend National Park
Dissertation	Major Advisor: Dr. Jon Zak	Department of Biological Sciences	Grassianus of big benu National Park
			Chemotherapeutic Challenge of the Chernobyl Rodent Apodemus
1st Place Thesis	Eric Howell	Department of Biological Sciences	flavicollis
	Major Advisor: Dr. Lou De	ensmore	
		Department of Environmental	Acute and Developmental Toxicity of Metal Oxide Nanoparticles
2nd Place Thesis	<b>Shawna Nations</b>	Toxicology	(ZnO, TiO2, Fe203, and CuO) in Xenopus laevis
	Major Advisor: Dr. Georg	e Cobb	

# **Humanities/Fine Arts**

1st Place	Dr. Stephanie		Ananymity Colobrity and Authorship 1700 1022
Dissertation	Eckroth	Department of English	Anonymity, Celebrity and Authorship, 1780-1823
	Major Advisor: Dr. Ann	Hawkins	
2nd Place			The Marine Corps Way: Combined Action Platoons in the Vietnam
Dissertation	Dr. John Southard	Department of History	War
	Major Advisor: Dr. Ron		
	Milam		
	Leslie (Micah)		And Footlights Lit the Path of the Righteous: Theatricality and
1st Place Thesis	Branson	Department of Theatre & Dance	Performance in the Second Great Awakening
	Major Advisor: Dr. Doro	thy Chansky	
2nd Place Thesis	Cody Lass	Department of History	Read All About It: Nationalism During the American Revolution
	Major Advisor: Dr. Etha	n Schmidt	

2010

# **Mathematics, Physical Sciences, & Engineering**

1st Place		Department of Mathematics and	Robust Control of Saturating, Non-Monotone Hysteretic Systems
Dissertation	<b>Dr. Dinesh Ekanayake</b> Major Advisor: Dr. Ram Iyer	Statistics	with Non-Linear Frequency-Dependent Power Losses
2nd Place			Reinforcement Learning for Closed-Loop Propofol Anesthesia: A
Dissertation	<b>Dr. Brett L. Moore</b> Major Advisor: Dr. Larry Pyeatt	Department of Computer Science	Human Volunteer Study
			Effects of Fullerenes and Functionalized Fullerenes on Daphnia
		Department of Environmental	Magna: Behavioral Respomses and Interactions of Functionalized
1st Place Thesis	Kathryn Brausch	Toxicology	Fullerene with Hydrophobic Organic Contaminants
	Major Advisor: Dr. Jonatha	an Maul	
		Department of Petroleum	Three-Phase Unsteady-State Relative Permeability Measurements in
2nd Place Thesis	Peilin Cao	Engineering	Consolidated Cores Using Three Immiscible Liquids
	Major Advisor: Dr. Shame	em Siddiqui	

### **Social Sciences**

1st Place		Department of Educational	Development and Psychometric Exploration of the Online Teaching
Dissertation	Dr. Kevin Gosselin	Psychology and Leadership	Self-Efficacy Scale
	Major Advisor: Dr. Hansel	Burley	
2nd Place	Dr. Jose Antonio	Department of Agricultural and	The Mexican Meat Market: An Econometric Analysis of Demand
Dissertation	Lopez	Applied Economics	Properties and Trade
	Major Advisor: Dr. Jaime		
	Malaga		
		Department of Human Development	Personality, Work Demand, and Romantic Relationships
1st Place Thesis	Andrea V. Roets	and Family Studies	reisonality, work bemaild, and komantic kelationships
	Major Advisor: Dr. Anisa Z	vonkovic	

		Department of Agricultural	A Preassessment for Developing a Food Safety Training Program for
2nd Place Thesis	Abigail McCulloch	<b>Education and Communications</b>	Self Service Food Bars in Grocery Stores
	Major Advisor: Dr. Scott Burris		

# 2009

# **Biological and Life Sciences**

1st Place Dissertation	Dr. Jennifer Huddleston	Department of Biological Sciences	Natural Transformation in Aeromonas Species
	Major Advisor: Dr. Randall Jet	er	
			Early Indications of Breed Differences for Cryopreservation
1st Place Thesis	Julie Weathers	Department of Animal & Food Science	of Embryos in Cattle
	Major Advisor: Dr. Samuel Pri	en	
			Cytotoxicity of Selenocyanobiotin Against MDA-MA-231
2nd Place Thesis	I-Huei Tsai	Department of Nutritional Sciences	Breast Cancer Cells
	Major Advisor: Dr. Shane Blur	n	

# **Humanities/Fine Arts**

1st Place Dissertation	Dr. Jordan Cofer	Department of English	Flannery's Bible: Biblical Recapitulations in the Fiction of Flannery O'Conno
	Major Advisor: Dr. Jim Whitlark		
			Ritmo Caliente: Cal Tjader, 1950s Dichotomies, and the Story of
2nd Place Dissertation	Dr. Ian Rollins	Department of Music	Latin Jazz
	Major Advisor: Dr. Christopher Smith		
1st Place Thesis	Kyle Conway	Department of Fine Arts	Will Eno: The Page, the Stage and the Word
	Major Advisor: Dr. Dorothy Chansk	ху	

2nd Place Thesis	Brian Yost	Department of English	Globalization, Commercial Culture, and Contemporary U.S. Fiction
	Major Advisor: Dr. Michael Borshu	ık	