Curriculum Vitae

Nikolay   Metodiev   Sirakov
First name   Middle name   Surname

Affiliation and Official Address:

Deptment of Mathematics
Texas A&M University Commerce
Commerce, TX 75429
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URL: https://www.tamuc.edu/people/nikolay-sirakov/

Education: (degrees, dates, universities)

Ph.D. degree: Center of Mathematics, Computer Science & Mechanics-Bulgarian Academy of Sciences (BAS); **Pattern Recognition**-Title: 3D object recognition through regularities, order and set of identification. The work was developed under international project "Robotic Systems for Nuclear Reactor Inspection".

Master degree- Sofia University (SU)- School of Mathematics & Computer Science, in **Coding Theory**, Title: New examples of (15,11) systematical, non-Vasiliev, non-linear, perfect codes correcting one error, *defended 1983.*

B.S- Sofia University (SU) "Kl. Ohridsky"- School of Mathematics & Computer Science, *the top Math and Informatics Dept. in the country, the top School in the country.*

Bulgarian National High School of Mathematics and CS "Lubomir Chakalov", 1973-1976, preparatory school for Bulgaria's CS and Math Olympic team and Olympic team hopefuls.

Career/Employment: (employers, positions and dates)

Texas A&M U Commerce, Dept. of Computer Science, Dept. of Math – Professor 2015-present

	Associate Prof. 2010-2015;
	Assistant Prof. 2004-2010
Northern Arizona University- US– Dept. Math & Statistics	*2001- 2004;*
Institute of Mechanics and Biomechanics- BAS - *Associate Professor*	1999 –2001;
Instituto Superior Tecnico, Lisbon, Portugal- Senior Researcher, Invited Professor	1993, 1998-1999, 2000
Transport University - Invited Associated Professor	1995-1997
Int. Lab of Artificial Intelligence – Slovak Academy of Sciences – Research Fellow I degree –1990	
Institute of Mechanics- Biomechanics – BAS - Research Fellow I – III degree,	1988-1990
Technical University Sofia - Invited Assistant Professor	1988

Leadership Positions Held:

Chair Post Tenure Review Committee – Fall 20203

Chair CoSEA Tenure and Promotion Committee – 2012-2014

Chair Programing Courses Policy Committee – 2016

Chair CS Dept ad hock committee for developing policies regarding CSCI 515, CSCI516 – Spring 2013;
Chair 6 graduate thesis committees – 2011-2018

Co-chair Modeling Team, Dept. Math and Stat, Northern Arizona University, 2001- 2004;

Scientific Chair of Biomechanics and Telemanipulators Lab., Institute of Mechanics 1996-1998.

Leading Research Collaborations:

1. **Baylor University Medical Center**-Dr. Alan Menter MD, **Director Dermatology Division**, Dr. G. Hosler MD, L. Dickson, MD, J. Frieder MD, **Texas A&M U Commerce**, **Dept. of Computer Science** Dr. Mutlu Mete – **Automated System for early Melanoma Diagnosis**, 6 peer reviewed papers published, *2013- 2020;*

2. **Texas A&M U Commerce, Dept. of Computer Science** Abdullah Arslan, **Automatic Threat Containers Detection in Carryon Baggage,** 1 peer reviewed paper published *2016 present.*

3. *Texas A&M U Commerce, Dept. of Computer Science, Computational Linguistics* Dr. Sal Attardo, Dr. Abdullah Arslan, *Automatic Weapons Identification and Threat Assessment*- 6 peer reviewed papers published, *2013- present;*

4. *University of Alabama at Birmingham - Electrical and Computer Eng. Dept.* Dr. Arie Nakhmani, PhD student **Pravin Kandhare** – *Automatic Tracking Targets in Video*, 2 peer reviewed papers published, *2016 present;*

5. *University Paris 13, Sorbonne Paris Cité, France, L2TI Lab* - Dr. Marie Luong, Dr. Emmanuel Viennet, PhD student Long Ngo, *Active Contours, Medical Images Features Extraction, Sparse Representation Classification*, 6 peer reviewed papers published, *2012-present.*

6. *Texas A&M University Commerce, Dept. of Mathematics,* Adam Bowden, Oluwaseyi Ingbasanmi, Mengzhe Chen – *Euler-Lagrange and Poisson Image PDEs active contours, image segmentation, Vector Fields generation and study* - 5 peer reviewed papers published, *2013-present.*

7. *Yildiz Technical University, Istanbul Turkey, Dr. Mutlu Akar,* Application of Clifford Algebra to color image modeling and skin lesion classification. *2017-present.* 1 peer reviewed Journal paper.

Industry Agencies Connections:

a) Review Department of Homeland Security funded projects: CLASP (Correlating Luggage and Specific Passengers); AATR (Adaptive Automatic Target Recognition (ATR));
b) **Microsoft** - Product Security, Cryptography, Virtual Reality, Operating Systems, Architecture;
c) **Uber** - Product Security; Bug Bounty Program;
d) **Google** – Software engineering.

Departmental, collage, university service:

US EXPERIENCE, 2001- Present:

TAMUC-2004 present

- ✓ Member University T&P Policies Revision- **Fall 2022- present, convened by the Provost**
- ✓ Member Faculty Senate – **Fall 2022- present**
- ✓ Member CoSE Tenure and Promotion Committee- **Fall 2017 – 2020, 2023- present**
- ✓ Member of the *University Graduate Council* – 2016-2019;
- ✓ Member of the *University Research Creative Activities Committee* – 2014-2017;
- ✓ Research Enhancement projects review and evaluation – Spring **2014**;
- ✓ ABET, SACS – Reports development participation – **2013, 2015,**
- ✓ Main Events presentations- **2006-2015,**
- ✓ Junior Faculty Research Award –review and evaluation – Summer **2014.**
- ✓ Joint-TAMUC-TUS- Comp. Sci. Master Program Development **Fall 2012;**
- ✓ Memorandum for Cooperation between TAMUC & Technical University Sofia (TUS)- **2012.**
- ✓ Faculty Search Com. Dept. of Mathematics, Dept. of Literature & Languages, **2012, 2015;**
- ✓ Tenure and Promotion Committee CoSEA. **2011- 2014.**
- ✓ Defense committee for Math595 project, Aida, August 01, **2012;**
- ✓ Dean of COSEA Search Committee, since April 20, **2011** from Math Dept;
- ✓ Task Committee for development of a Ph.D. Program in Comp Sci.–**2009.**
- ✓ CS Dept. Assessment Team – October 02, **2009-present;**
- ✓ Committee development the new CS- Master's degree in Computational Science – **February 19, 2009, May 2009;**
- ✓ Judge for the Pathway students and Young Faculty presentation contest **November 7-8,2008;**
- ✓ Graduate School Representative at the Ph.D. defense of Nr. Campanaro, **Oct. 28, 2008;**
- ✓ Committee to enroll Bulgarian graduate student at Dept. of Mathematics, **2008;**

- ✓ Work on the undergraduate program pamphlet of the CS Dept.- **November 2008**.
- ✓ Advisory Committee of Caleb Grisham for his Math595 report- **August 01.2008**;
- ✓ Advisory Committee of Katsuhiro Iwao for his Math595 report- **August 07.2008**;
- ✓ Ad hoc Committee recruiting International students, **2007**.
- ✓ Curriculum Committee – Computer Science Department, **2007**;
- ✓ Undergraduate Research Committee- Department of Mathematics, **2006-2007**;
- ✓ Proctor of the TMSCA content, January 29.**2005**.
- ✓ Undergraduate Research Development Committee- since **Fall 2004-Spring 2005**;
- ✓ University Initiative Committee for development of REU program- **Fall 2004-Summer 2005**.
- ✓ Member of Discreet Math Textbook Selection Committee, Dept. Math and Stat, NAU, **2003**.

Supervising PhD Students Research and PhD Committees:

1. Indian Institute of Engineering Science and Technology, West Bengal, India, **2023,** PhD student Sabyasachi Mukherjee, *Subject:* Disease Diagnosis using Medical Imaging, *I am member of the PhD Committee,* **2023**.
2. Avinash Singh- Image data distillation and augmentation - University of Alabama at Birmingham – Ph.D. outer research advisor to the student, in the field of. **2021- present**
3. Long Ngo – Sparse Representation Wavelet Classification (SRWC), SR classification Quaternion Wavelets, University Paris 13, L2TI – PhD thesis collaborator and outer advisor-**Sept. 2017-2021,**
   Publications: 3 peer reviewed, 2 journal, +ICIP2018;
4. Pravin Kandhare - Tracking objects video, Bradycardia vents prediction, University of Alabama at Birmingham – Ph.D. outer research advisor to the student, in the field of. **2016- 2021,**
   Publications: 2 Journal paper peer reviewed.
5. Indian Institute of Engineering Science and Technology, West Bengal, India, **2016,** Ph.D. student Oishila Bandyopadhyay, *Subject:* Automated Analysis of Orthopaedic X-ray Images. I was a member of her Ph.D. Committee.
6. University of Paris 13, France- **2012-2013**, Ph.D. student Thieu Tung, I was a member of his Ph.D. Committee, *Subject:* Convex Active Contours.
   Publications: 1 Journal paper with Impact Factor, 1 peer reviewed symposium paper.
7. Instituto Superior Tecnico Lisbon Portugal – 1999-2000- Ph.D. student Izabel Granado, I was a Co-supervisor of Dr. Fernando Muge, *Subject:* Mathematical Morphology, Image segmentation, 3D reconstruction.
   Publications: 1 Journal paper with Impact Factor, 1 peer reviewed symposium paper.

Supervising Master Thesis Texas A&M U Commerce, 2011-2018

10 successfully defended in the fields of: Data Distillation with PCA-1, Neural Networks-2, Vector Fields Features-2, Active Contours - 1; Active Contours and Features Extraction-1; Tracking objects with partial and/or full occlusion -3.
Publications with Master students: 2 peer reviewed Journal papers; 1- Lecture Notes in Computer Science-Springer Nature, 1- *Studies in Computational Intelligence* -Springer; 2 peer reviewed top 2% CS Symposiums posted by IEEE XPlore.

Supervising Graduate Research and Students in the US:

1. **Tahsin Shahnewaz** – Thesis Title: Principal Component Analysis for Training Data Distillation & Augmentation, 2022-2023.
2. **Oluwaseyi Igbasanmi** – **GAR funded by the President - Title:** Vector Fields with Complex Eugen Values to Image Classification, **2021 – 2023;**
   Thesis: CNN Based Object Classification Using Image and Poisson Vector Field Features, defended March 20, 2023.
3. **Emran Husen -** Dept. of Mathematics – Machine Learning, Convolutional Neural Networks (CNN) and CNN-SVM (support vector machine) – **2020-2021;**

4. **Natasha Astudillo** – Dept. of Mathematics – Classification with Stochastic Learning Methods Convolutional Neural Networks- **2018-2019**;
5. **Reginald Bowman-** Dept. of Mathematics – Classification with Stochastic Learning Methods Convolutional Neural Networks- **2018-2019**;
6. **Mengzhe Chen** – Dept. Mathematics - Singular Points of the Gradient Field of the Poisson Partial Differential Equation Solution on an Image, *defended Master thesis*, **2017 – 2018**;
7. **T. Msabaeka, J. Beach, L. Beene** – Automatic Detection of Targets in Video, **2017**.
8. **Chetana Nimmakayala-**Dept. CS, Tracking Multiple Objects with Occlusions, *Defended Master thesis*, **2015-2016**;
9. **Dheeraj Maddanagary-CS-** Parallel search in general graphs using GPU- Spring **2015**.
10. **Swathi Munagala-** Dept. CS – Tracking Multiple objects, *defended Master thesis* **2014-2015**;
11. **Adam Bowden** – Dept. of Mathematics – Active Contours on Partial Differential Equation, **Master Thesis, May 2014, American Institute of Physics paper**,
12. **Pravin Kandhare** – Dept. of Computer Science – Tracking Objects in a Video**,** *defended Master thesis*, **Journal paper Published,** Fall 2011- Spring 2014 .
13. **Melendez, John M.** - Grad Student Dept. Math.- **Title:** Image Segmentation Using Delaunay Triangulation with a Predicate, **2012**.
14. **Sheena Mathew** – Dept. of CS. Region Matching of Objects using Scaling and Rotational Invariant Methods, **2011-2012**.
15. **Surendra Chakrader Nara** – Dept. CS, **Title:** Enhancement of Skin Lesion Images to Remove Noise. *Defended Master Thesis*, **peer reviewed paper published**, 2009-2011,
16. **Srikanth Sriram** – Skin Lesions Features Extraction, and masks generation. **2011**.
17. **Jandhyam, Venkata N.** – Dept. CS, **Title:** Correlation and Shape Matching Methods;
18. **Karthik Ushkala**, Dept. CS, Image Segmentation and Analysis, Active Convex Hull Model based on the exact solution of the Heat Differential Equation, Active Contours, **2008- 2010**;
19. **Santhus Karapathy** – Dept. of CS, Knowledge extraction from Image Databases, **2008-2009**;
20. **Prathat Pollisetty:** - Dept. of CS, Completed and optimized the Java code of the Active Convex hull Model, **Fall 2008**;
21. **Kommu, Shrinivas** 50001262 – Web search and engines, for Content Based Image Retrieval. Google achievements, Spring-Summer 2007, 2D/3D Indexing **2007-2008**;
22. **Jason Moore,** Graduate Student- Dept. of Math, Gradient Methods to Image Enhancement, **2007**;
23. **Shah, Divyesh** R., Graduate Student – Computer Science, *Project:* Data fusion in intelligent systems, Web Archives, DICOM image formats, **Spring 2007**;
24. **Archana Chada** , Graduate Student – Computer Science, *Project:* C++ coding of a new active convex hull model, **Spring 2007**;
25. **Sudheer Musini** – Graduate Student CS Department– in the development of the NSF-CAREER proposal, summer 2006.

Supervising Master students in Europe:
- 3D visualization of bioorganic structures, School of Math and CS-Sofia University, 2002.
- 2D/3D visualization of multiple subsurface objects – modeling and interpolation, Image Analysis LAB (IAL) of CVRM-Instituto Superior Tecnico (IST)–Lisbon, Portugal, 1998-2000;
- 3D visualization. Shape from shading. IM-BAS, Technical University (TU) Sofia, Image Processing and Recognition Lab (IPRL), 1998;
- Virtual and Multimedia Libraries – architecture, content processing, TU-IPRG, 2000.
- Image Processing – objects partitioning, edge detection, image enhancement, IM-BAS and School of Math and CS –Sofia University, 1996-1998;
- 2D/3D visualization, modeling and reconstruction, IM–BAS and FMI-SU, 1996-1998;
- 2D/3D objects recognition approach to robot orientation in Power Nuclear Reactors, Center of Mathematics CS & Mechanics –BAS, School of Math and CS –Sofia University, 1989-1991.

Supervising Undergraduate Research in the US:
NSF-REU with TAMUC, Department of Mathematics 2023-2026 is waiting for negotiations and signing, Role – Senior Personal.

NSF-REU program Texas A&M U Commerce, Dept. Chemistry 2007-2008- one student researcher Reubin Hinman, Project **"**Enhancement and Features Extraction from Surface Images.**",** 3 seminars, during the program, one final presentation.

At NAU under REU Program, sponsored by NSF-2003-2004.

PROJECTS: http://odin.math.nau.edu/reuprojects.html

Title: 3D Edge Detection and Visualization based on the Geometric Heat Equation, 2004,
Student researcher Anthony DiPietro, Depts. Mathematics\Computer Science, Grove City College. *The work was funded for presentation on the Young Mathematicians Conference, Ohio State University, August 19-22.2004*;

Title: A Method for Rapid Edge Detection and Image Segmentation, 2004; Student researcher Michael Wells, Dept. of Mathematics, Rice University.

Title: An Application of Differential Equations to Image Processing, together Catherin Lichten *McGill University, 2003*;

Title: Objects Detection in an Image Database Using Shape Features, together with Andrey Kislauk, *University of California Berkley.*

Supervising Undergraduate Students in the US:

1. *Rebecca Steward* – Dept. of Mathematics – Graph Theory, summer **2011.**
2. *Rohan Narain,* Undergrad student CS Dept, *Project:* Content Based Image Retrieval Systems. 3D objects reconstruction and visualization, **Spring 2005**, **Spring 2008.**

- Given on-campus poster presentation -*Students Research Symposium* 10.22.05;
- Given presentation for the *Pathway Young Research* meeting in Kingsville-November 03-05.2005;
- A poster presentation for the Pathway Undergraduate Symposium – Prairie View Texas A&M Univ, Nov 10-11,2006, **Best CS presentation award**;
- A poster presentation on the Pathway symposium, **Nov. 03,2007**;
- Presentation to the TAMUC Annual Research Symposium 2008, Thursday April 24, 2008; Title: Image semantics for indexing of large image databases. **Best undergraduate presentation –award;**

3. *Will Harrell*, Undergraduate student CS Dept, Title: 3D visualization from 2D cross sections, **Fall 2007.**

4. *Bohannon, Derek*, Undergraduate student CS Dept, an introduction to 3D visualization, **Fall 2006;**

5. *Minh Tang*, Undergraduate student CS Department, *Project:* coding the Convex Hull algorithm to Image Database Indexing, C++ , Fall 2005, **Spring 2006;**

6. *Nathaniel Rowland*- Undergrad student CS Dept, C++ tool to implement a new Convex Hull Model based on the Geometric Heat Differential Equation, *funded by the Dean of College of Arts and Science under Undergraduate Student Research initiative*, **Spring 2005**. The submitted report was highly evaluated by the Dean of Arts and Science;

7. *Christopher Rex*- Boundary support and its applications, funded by the Dean of College of Arts and Science under Undergrad Student Research initiative, **Fall 2004.**

LECTURES

   📖   **Texas A&M U Commerce Dept. of CS and Dept. of Mathematics**

Lectures: *Fall 2004 – 2021; total # of students - Undergraduate above 3500; Graduate above 2000.*

Graduate Courses Developed: Image Processing with Application and Elements of Learning Math563;
Image Analysis with Recognition and Learning CSCI569/Math569;
Numerical Analysis and Learning Math546/CSCI546

Taught Graduate Classses: Image Processing with Applications and Elements of Learning CSCI567/Math563; Image Analysis with Recognition and Learning CSCI569/Math569; Numerical Analysis Math546/CSCI546; Machine Architecture Assembly Lang CSCI516; Algorithms Design CSCI532.

Undergraduate: Calculus III Math314; Differential Equations Math315; Discrete Mathematics Math331; Numerical Analysis Math317; Linear Algebra Math335; Calculus II and I; Pre-calculus.

   📖   **Northern Arizona University – Dep. Math & Statistics:**
- Summer 2004-Fall 2001 – Finite Math; Differential Equations and Numerical Methods; Calculus– total around 88 credit hours.

European Experience in Computer Science:

Developed Graduate Courses: "Modeling and visualization of 3D subsurface objects", Instituto Superior Tecnico-Lisbon, Portugal, end of 2000.

   📖 **School of Mathematics and Computer Science, Sofia University**, *graduate students*, spring 2001:
- Modeling, Reconstruction, Visualization and Manipulation of 2D/3D objects;

   📖 **CVRM-Instituto Superior Tecnico (IST) – Lisbon, Portugal**, *Master and Ph.D. students*, 1998-2000.
- Introduction to 3D modeling and visualization technology-C++ implementation.

   📖 **Institute of Mechanics (IM)-Bulgarian Academy of Sciences (BAS)**, *Graduate Students*-1995-1998:
- 2D/3D objects description, modeling, reconstruction and visualization – C++; 2D/3D Comp. graphics; Image Proc.; Pattern recog.; Coding Theory; Microcomputers/assembly language.

   📖 **Transport University Sofia, Dep. of Math and CS**, *Undergraduate students* - 1995 –1997:
- Computational geometry; Numerical methods and linear programming.

   📖 **Technical University Sofia, Department of Applied Math**, *Undergraduate students*, 1987-1990:
- Discrete math; Numerical Methods- implementation by FORTRAN; Intro to Optimization.

Record of Talks And Invited Talks in the Us, 2001-Present:
At Professional Meetings and Conferences 2005 - present:

Title: CNN for Efficient Objects Classification with Embedded Vector Fields, ICCIDA2023, July 21-22,2023, Oluwaseyi Igbasanmi, **Nikolay M. Sirakov**, and Adam Bowden, **Best Paper Award**

Title: Calculation of the Clifford Algebra Multivector Coefficients, Joint Mathematics Meetings, Boston, Jan 04-07, 2023, 8:45 -9AM, Mutlu Akar, **Nikolay Metodiev Sirakov**.

Title: Vector Fields Under Plane Scaling and Translation, March 31 - April 2, 2022, University of North Texas, Denton, Texas , Oluwaseyi Igbasanmi, Adam Bowden, **Nikolay M. Sirakov**.

Title: Prediction of Bradycardia Episodes in Very Preterm Infants, PAS 2022, Colm P Travers[1], MD, Arie Nakhmani[2], PhD, Pravinkumar G Kandhare[2], PhD, **Nikolay M Sirakov[3], PhD**, Deborah Laney[1], RN, MSN, Waldemar A Carlo[1], MD, Namasivayam Ambalavanan[1], MD,

Title: Investigating Deep Euler-Lagrange-Poisson Segmentation Learning For Image Segmentation, Texas section meeting **MAA**, March 28-30, **2019**, Texas , A. Bowden, **N.M.Sirakov**,

Title: P. Kanhdare, A. Nakhmani, N.M.Siakov, "Mutli-Target Trajectory Tracking of Cells," Southern Biomedical Eng. Conf. – 35th Annual Meeting Feb. 22-24, **2019**, University of Southern Mississippi

Title: Poisson Equation Solution and Its Gradient Vector Field to Geometric Features Extraction, at the International Conference of Theory and Practice of Natural Computing, December **12-14, 2018**, Dublin, Ireland, talk of 30 min.

Title: Image Related Properties of the Euler-Lagrange and Poisson PDEs, **Plenary Speaker**, ICAAMM2018, Istanbul Turkey, **July 20-24, 2018**.

Title: Poisson Image PDE Solutions and Applications, 97th Annual Meeting of the Texas Section MAA–04/5-6/2018, El-Centro College, Dallas, Mengzhe Chen, Adam Bowden, Nikolay M. Sirakov.

Title: Singular Points of the Gradient Field of the Poisson Partial Differential Equation Solution on an Image, TAMU System Pathway Students Symposium, **Nov. 03, 2017**, Tarleton State U., **1st Place Winner in Mathematics**. M. Chen, **N.M.Sirakov**.

Title: Automatic Detection of Moving Targets in Video, TAMU System Pathway Students Symposium, **11.03.2017**, Tarleton State U., abstract. **3rd Place Winner In Mathematics**, Tsitsi Msabaeka, Janessa Beach, Laura Beene, **N. M. Sirakov**.

Title: Title: Basics of Skin Lesion Classification in Clifford Algebra, at the 2017 AMS Fall Western Sectional Meeting in University of California Riverside, CA, **Nov. 4-5, 2017**, M. Akar, **N. M. Sirakov**.

Title: A Novel Automated Dermoscopy-Based Image Analyzer for the Clinical Evaluation of Pigmented Lesions and Early Detection Of Melanoma, Texas Dermatological Society, **Sept. 2017**, San Antonio, TX, L. Dickson, MD, J. Frieder, MD, J. Griffin, MD, G. Hosler, MD, Ph.D., M. Mete, Ph.D. **N.M.Sirakov**, Ph.D, A.Menter, MD. **2nd Place Winner**

Title: Inscribing Convex Polygons in Star-Shaped Objects, 18th International Workshop on Combinatorial Image Analysis, **19-22 June 2017**, Provdiv, Bulgaria.

Title: Shape Matching for Rigid Objects by Aligning Sequences Based on Boundary Change Points, 18th Inter. Workshop on Combinatorial Image Analysis, **19-22 June 2017**, Provdiv, Bulgaria.

Title: Improvements in ELPAC Segmentation and Applications", 96th Annual Meeting Texas Section MAA – **04/01/2017**, Texas A&M U Commerce, **N. M. Sirakov.**

Title: Mathematical Concepts with Image Analysis Applications, **Nov. 12-13, 2016, Invited Speaker** at Lloyd Roeling UL Lafayette Mathematics Conference (organized annually since 1974), University of Louisiana at Lafayette.

Title: Partially Occluded Weapons Identification Through Partonomy, ADSA14, ALERT Center of Excellence at Department of Homeland Security, May 9-10, 2016, Northeast U, Boston, **Invited Speaker. Participation only by Invitation.**

Title: New Accurate Automated Melanoma Diagnosing Systems, IEEE-ICHI2015, Dallas,10.22,2015

Title: Identification of Partially Occluded Firearms Through Partonomy, **Invited Speaker**: SPIE 2015, Defense Security and Sensing, Automatic Target Recog., Baltimore, **April 22, 2015**.

Title: Investigations into the Noise and Multiple Region Segmentation Abilities of Euler-Lagrange Poisson Active Contour, 9th Int. Conf. on Differential Eq. and Dynamic Systems, Special Session: Appl. of DE and DS to Science and Industry, **May 14, 2015**, A. Bowden.

Title: Optimal Set Of Features For Accurate Skin Cancer Diagnosis, IEEE ICIP 2014, International Conference of Image Processing 2014, IEEE ICIP2014, Paris, **October 28-30, 2014**;

Title: Tracking Partially Occluded Objects With Centripetal Active Contour, 16th Inter. Workshop Combinatorial Image Analysis 2014, IWCIA2014, Brno-Czech Republic, **May 20-30, 2014,**

Title: From Shape to Threat: Exploiting the Convergence Between Visual and Conceptual Organization for Weapon Identification and Threat Assessment, *SPIE "Defense, Security and Sensing",* April 30, 2013, **10:50AM-11:35AM** in Baltimore, MD, **Invited Speaker.**

Title: Skin Lesion Feature Vector Space with A Metric To Model Geometric Structures of Malignancy, 15th Int. Workshop on Combinatorial Image Analysis, UT Austin, 10.28-30, 2012.

Title: Local Global Fuzzy Gaussian Distribution Energy Minimization of a Convex Active Contour Model, 15th Int. Workshop on Combinatorial Image Analysis, UT Austin, **Oct., 28-30, 2012.**

Title: Mathematical Concepts with Image Analysis Applications, **Nov. 02-04, 2012, Lloyd Roeling UL Lafayette Mathematics Conference** (organized annually since 1974), **University of Louisiana at Lafayette, Dept. of Mathematics, 1h Invited Talk**.

Title: Weapon Ontology Annotation Using Boundary Describing Sequences, IEEE SSIAI, Santa Fe, New Mexico, **April 22-24, 2012**

Title: Automatic Boundary Detection and Symmetry Calculation In Dermoscopy Images of Skin Lesions, Poster session 10:15AM-1PM, IEEE ICIP2011, Brussels, Belgium, **Sep. 13, 2011.**

Title: Integration of Low Level and Ontology Derived Features For Automatic Weapon Recognition and Identification. *SPIE Defense, Security, and Sensing-Automatic Target Recognition XXI,* **25 - 29 April 2011**, Orlando, Florida,

Title: Automatic Object Identification Using Visual Low Level Feature Extraction and Ontological Knowledge, SDPS'2010- *Society for Design and Process Science*, Dallas, Texas, **June 09, 2010.**

Title: Tracking Neutrophil Cells by Active Contours with Coherence and Boundary Improvement Filter, IEEE SSIAI2010, Austin, Texas, **May 24, 2010.**

Title: An Active Vector Field for Boundary Extraction of Objects with Complex Geometric, SPPRA 2010, Austria, Innsbruck, Friday, **Feb. 19, 2010.**

Title: An Integral Active Contour Model for Convex Hull and Boundary Extraction, International symposium on Visual Computing, Las Vegas, **Nov. 30-Dec. 02, 2009.**

Title: Shape's Related 3D Objects Indexing and Image Database Organization, IEEE Southwest Symposium on Image Analysis and Interpretation, Santa Fe, New Mexico, **March 25, 2008.**

Title: Monotonic Vector Forces and Green's Theorem For Automatic Area Calculation, IEEE International Conference on Image Processing, San Antonio, **Sep. 16-18,2007.**

Title: Content Based Search in Web Archives, World Congress in Applied Computing – Internet Computing 2007, Las Vegas, June 25-28, 2007.

Title: Automatic Concavity's Area Calculation Using Active Contours and Increasing Flow. IEEE International Conference on Image Processing, Atlanta Georgia, Oct. 08-11, 2006.

Title: Multiple Surfaces Reconstruction from 2D Sections Using an Increasing 2D Vector Flow, The 2006 World Congress in CS Comp. Eng., and Applied Comp., Las Vegas, June 26-29, 2006

Title: A New Automatic Concavity Extraction Model, IEEE Southwest Symposium on Image Processing and Analysis, Denver, Colorado, March 26-28, 2006.

Title: Heat Equation to 3D Image Segmentation, The 9th World Multi-Conference on SYSTEMICS, CYBERNETICS AND INFORMATICS, WMSCI 2005, Orlando, USA , July 10-13, 2005.

Title: A New Active Convex Hull Model for Image Database's Search Space Partitioning, 2005 World Congress in Applied Computing - VISION'05, Las Vegas, June 20-23, 2005.

Talks and Invited Talks Given by me at Colloquia and Seminars, 2004- Present

Title: Classification of Objects with Embedded Singularities, Math Department Colloquium. November 29, 2023, 3:30PM-4:30PM.

Title: Biomedical Image Features Extraction and Classification with Vector Fields Driven Active Contours and Neural Networks, Electrical and Computer Engineering Dept. at University of Alabama at Birmingham – Tea Time Seminar – Feb. 19, 2021, 11AM-12:50PM,

Title: Image Features Extraction and Classification Studies with my Research Students, Math Club Meeting, TAMUC, April 07, 2021, 6PM-7PM.

Title: About Some Wonders Made by Mathematic, Math Club February 13, 2020, 6PM – 7PM

Title: About Some Wonders Made by Mathematic, Adventure in Mathematics, Feb. 14, 2023, 1PM-2PM

Title: Skin Lesion Features Extraction and Classification with SVM in Clifford Algebra Sub-Spaces, with Neural Networks Sorbonne University Paris 13, France, L2TI Lab, Invited Seminar, 07.24.2019.

Title: Support Vector Machine Skin Lesion Classification in Clifford Algebra Subspaces, Math Department Colloquia, October 31, 2018, talk by Dr. Mutlu Akar, Dr. N.M.Sirakov

Title: What Links Computer, Science, Engineering and Medicine? The Answer and an Example – 02/02/2018, TAMUC, Math Club, Invited Talk given talk by- Sirakov, Bowden

Title: Tracking objects with SURF in video, Annual Research Symposium-TAMUC, April 07, 2016, oral presentation Chetana Nimmakayala, N.M.Sirakov.

Title: Poison Equation Generated Vector Fields on Images for the Purpose of Segmentation, Ontology Group seminar, Sept. 17, 2015.

Title: Handling Noise And Multiple Region Segmentation With A Euler – Lagrange Poisson Active Contour, Colloquium, Department of Mathematics, Monday February 16, 2015, by Bowden, Sirakov.

Title: New Automated Melanoma Detection Rules, Invited Talk at Baylor University Medical Center – Cancer Center–Skin Tumor Seminar (Skin Tumor Board): Nov. 19, 2014.

Title: Partial Differential Equations and Active Contour Models. Seminar at Department of Mathematics, TAMUC, Nov. 04, 2013.

Title: What Can You Do With a Mathematics Degree? – Math Club Meeting, Jan. 27, 2012

Title: About Visit Experience and Ideas on Identification, Matching and Tracking, Mathematical Colloquia Dept. of Mathematics, Nov. 30, 2011.

Title: Mathematical Concepts with Image Analysis Applications, Nov. 18, 2011, 1PM -2PM, Invited Talk, University of Louisiana at Lafayette, Dept. of Mathematics.

Title: New Family of Active Contours with Image Enhancement & Region Matching, Math Department Colloquium, TAMUC, Nov. 23, 2010.

Title: The Exact Solution of the Active Convex Hull Model And Its Application to Image Segmentation, Invited Talk, UT Arlington, Applied Mathematics Seminar-Department of Mathematics at UT Arlington, March 06, 2009, 2:30, Pickard Hall, Room304, attended by both Math and CS Faculty and Ph.D. students.

Title: The Active Convex Hull Model Its Level Set Presentation and Exact Solution. Math Colloquium on November 13, 2008, 3PM-4PM;

Title: Image Databases to Science. Methods for Features Extraction. **Invited Talk,** Seminar Dept. of Physics TAMUC- **September 27,2007**, 4PM-5PM, Room 127, Science Build.,

Title: About An Edge Where Mathematics and Computer Science Meet; **Invited Talk** at UT Arlington, Applied Math Seminar, Dept. of Mathematics, **Feb. 02,2007**-2:30, Room 304,

REU seminar on June 06, 2007, **Title:** Enhancement and Features Extraction from Surface Images.

Title: Image Database Management and Indexing, Brain, Computation and Mind Seminar, Dept. of CS, **Dec. 08, 2006**, Science Building 355.

Title: Level Set Formulation of the Heat Differential Equation, Applications to Content Based Image Retrieval, Dept of Mathematics and CS, Jour 129, **May 05,2006**.

Title: Introduction to Mathematica, and its Applications; An Application of Derivatives and Interpolation to 2D and 3D objects modeling, Image Evaluation and Retrieval; *TAMUC, Undergraduate Research Program,* **June 07-08, 2005**,

Title: Digital Image Databases and 3D Visualization Applications to Science and Industry, *TAMU-Commerce, Department of Chemistry,* **Feb. 10, 2005.**

Title: A New Image-Region's Active Convex Hull Model For Content Based Image Retrieval, *TAMU-Commerce, Dept. Math and Dept. of CSIS,* **Sept. 30.2004**.

Title: Over Some Open 2D/3D Shape Features Extraction and Matching Problems, *TAMU-Commerce, Dept. CSIS,* **Sept. 29.2004**.

Title: An Introduction to Digital Image Databases and Content-Based Image Retrieval, *TAMU-Commerce, Depts. of Math, CSIS,* **Sept. 16.2004**.

NAU, 2001-2004

Title: Heat Equation and Gradient Flow to Capture an Image Object in a Dynamic Image Database. *NAU-Department of Math and Statistics, Regular Seminar*, USA, 04/02/2003.

Title: Images interpolation and Image database querying. Active Contours. *Northern Arizona University-Department of Math and Statistics, Regular Seminar*, USA, 11/26/2002.

Title: Shape matching of words in Digitized Renaissance Books. Smooth Reconstruction and Visualization of Multiple 3D Objects in Case of Shortage Input Data. Computer Science Dept.-Eastern Michigan University, USA, 04/01/2002.

Title: Surfaces Construction Using Regularities and Sequences of Observation, *Northern Arizona University-Department of Math and Statistics, Regular Seminar*, USA, 03/19/2002.

Title: Over optimal surface reconstruction methods, *Applied Math Seminar, Department of Mathematics and Statistics- Northern Arizona University*, USA, 01/23/2002.

Title: Math and Statistics to Image Processing and Objects Reconstruction. An Example Approach, *NAU-Department of Math and Statistics, Regular Seminar*, USA, *10/23/2001.*

In Europe:

Title: 3D reconstruction and visualization of human tibia for prosthesis design, *IM-BAS, Bulgaria,* 2001.

Title: A software system, developed by Visual ++C, for shape matching of words in digitized Renaissance books. *Meeting of the International project DEBORA*, IST–Lisbon, *Portugal,* fall 2000.

Title: 3D surface modeling, reconstruction and visualization of multiple complex subsurface objects - ore bodies, ore types, groundwater units. *CVRM-IST–Lisbon, Portugal,* 1998-2000.

Title: Shape matching of Renaissance Words using regularities and finite numerical sequences. *General meeting of the International project DEBORA,* Attended by the members of RFV-INSA, Lyon, France, Comp. Sc. Dep. - University of Lancaster-UK, CVRM-IST, December 1999.

Title: Virtual Multimedia Library – architecture, contents, *INSA-Lyon, Laboratorie de Reconnaisance de Formes et Vision (RFV), France,* June 1999.

Title: Over some problems of Image to Text/Text to Image transfer system, the Group of Prof. Dr. Liming Chen-*Ecole Central de Lyon*, software developing Company –SGBI- *Lyon, France,* June 1999.

Title: Solving of 3D modeling, visualization and recognition problems using series of plane sections, *Technical University of Dresden* – Institute of Acoustics, *Germany,* September 1997.

Title: Regularities and finite numerical sequences to 3D objects representation, shape reconstruction and visualization, *CIMPA Institute "Virtual Reality"- Nice, France* – June 1995.

Title: Objects recognition by single view, *CVRM-IST– Lisbon, Portugal,* June 1994.

Title: New effective method and software tool to 2D/3D objects comparing, *CVRM-IST, Portugal,* 1994.

Title: 3D Objects Recognition Method to Robot Orientation and Control in Nuclear Reactors, *CVRM-IST, Lisbon, Portugal,* October 1993.

Title: Recognition of shape from finite series of plane figures. *NATO Advanced Study Institute "Shape in Pictures", Driebergen, the Netherlands,* 1992.

Title: Application of regular structures and identification sets to 3D objects recognition in robotics, *International Lab of Artificial Intelligence- Slovak Academy of Sciences-* Bratislava, October 1990.

Title: Application of FORTH language to robot's local motion control;

Title: An aspect graph based effective approach for 3D objects and scenes description to robot orientation in a global scene. *Polish Academy of Sciences-Institute of Biocybernetics and Bioengineering,* 1987-1989.

Areas of Research Activities:

- Training Data Distillation and Augmentation- **2022 – present**
- Biomedical Events (bradycardia) and Signal Prediction – **2020- present**
- Machine Learning in Neural Networks and Sparse Representation Classification - **2018 - present**
- Poisson Image PDE gradient vector fields singularities to objects classification- **2017-present**
- Clifford Algebras to color Image Representation and Classification– **Spring 2017 present**
- Sparse Representation Classification in Wavelets, Quaternion Algebra - **Spring 2017 present**
- Automated Threat Containers Detection in Carryon Baggage – **Fall 2016 - 2017**
- Automated Skin Cancer Prediction and Diagnosis – **Fall 2015 present;**
- Skin lesion features extraction and automatic melanoma diagnosis - **2010 – present;**
- Firearms Threat Assessment- **Fall 2009-2019**;
- Tracking objects in video sequences- **2009-present**;
- Active Contours –Heat, Euler-Lagrange, Poisson PDEs– **2004 present;**
- Features extraction, and indexing in 2D and 3D, **2004 - 2014**;
- Scientific Visualization and reconstruction - 2D/3D objects modeling and interpolation;
- Digital and Multimedia Libraries;
- Image processing; Computer Vision; Pattern recognition;
- Robot control and vision.

Fields of application: Medicine, Security and Surveillance, Robotics, Internet.

Fellowships and Grants:

- *Visiting Academic Professor* at L2TI Lab, **Sorbonne Univ. Paris 13**, France, June 17 – July 16, 2019.
- Competitive Travel Grant by Faculty Development Committee, TAMUC, 2005-**2018**.
- The undergraduate research I did was granted and funded for presentation by the Org Committee of the Young Mathematicians Conference, Ohio State University, August 19-22.2004.
- Invited Professor at CVRM-IST, under *European Community Project DEBORA*, fall of 2000;
- NATO Senior Research Fellow at IAL of CVRM-IST, *Lisbon, Portugal,* Title: Morphological and recognition techniques to geometrical modeling and visualization of multiple complex 3D objects, 1999;
- NATO Senior Research Fellow, at IAL-CVRM- IST, *Lisbon, Portugal,* Title: Image Analysis and Visualization to Quality, Environment and Natural Resources Control, 1998;
- Participant of NATO Advanced Study Institute "Deposit and Geoenvironmental Models for Resources Exploitation and Environmental Security", *Hungary-*Matrahaza, 1998.
- Visiting Assistant, Technical University of Dresden – Institute of Acoustics- fall 1997, DFG program;
- Visiting Lecturer, CIMPA Summer Institute "Virtual Reality", *Nice - France –* 1995;
- Research Fellow under European Community - PECO, CVRM- IST, Lisbon, *Portugal,* Title: Application of Pattern Recognition to Material Reconstruction and Defectology, 1993- 1994;
- Invited lecturer of NATO Advanced Study Institute "Shape in Pictures", *The Netherlands,* 1993.
- Research Fellow at the International Laboratory of Artificial Intelligence- Slovak Academy of Sciences- Bratislava, *Slovakia,* end of 1990-1991;

♦ The paper "Automatic Reconstruction of 3D Branching Objects" awarded the best paper at IM-BAS, 1996.

Visiting Research Fellow

Visiting Research Fellow at TAMUC October 15, 2018 – October 14, 2019 – Dr. Mutlu Akar – from Yildiz Technical University, Field of expertise Clifford Algebras. Funding by the Turkish Research foundation TUBITAK – **project funded with 30K.**

Review Papers in the US, 2002- Present.

JOURNALS:

ᑫ Innovation and Research in BioMedical Engineering – IRBM- Elsevier, **IF 1.856, 2021-2022.**

ᑫ - AEUE - International Journal of Electronics and Communications - Elsevier, **IF 3.183, 2021-2022.**

ᑫ Annals of Mathematics and Artificial Intelligence – **IF 1.01, 2016 - present**

ᑫ Artificial Intelligence in Medicine – Elsevier – **IF 3.57, 2019 - present**

ᑫ SIAM Journal on Scientific Computing – **2019 - present**

ᑫ Journal of Information Science - **Impact Factor 4.83, 2016-present**

ᑫ Journal of Computer and System Sciences- Elsevier - **Impact Factor 1.583, 2017-present**

ᑫ Expert Systems with Applications – Elsevier, **Impact Factor 2.981 by SCI, 2016- present**

ᑫ J. Investigative Psychology – Threat assessment – **IF 0.6 ,** 2017;

ᑫ Neural Computing and Applications - **IF 1.569, since 2015- present;**

ᑫ Discrete Applied Mathematics – **IF 0.802, since 2014- present;**

ᑫ IEEE Transactions on Medical Imaging – **IF: 3.79, 2014- present**

ᑫ Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization- Taylor & Francis, **IF-1. 39, 2014 - present;**

ᑫ Pattern Analysis & Applications Journal, Pub. by Springer Verlag, **IF 1.346,** 2010- **2014.**

ᑫ Annals in Mathematics and Artificial Intelligence, Springer - **IF-0.35, 2013 present;**

ᑫ Journal of Applied Mathematics and Computation, Elsevier Pub., **IF 1.138, since 2010,**

ᑫ International Journal of Computer Mathematics -**2012.**

ᑫ The Arabian Journal for Science and Engineering, Published in Saudi Arabia, **2009, 2012**

ᑫ Pattern Analysis & Applications Journal, Published by Springer Verlag, **since 2007, present, IF 1.367,** Journal Citation Reports®, Thomson Reuters,

ᑫ IEEE Transactions on Information Technology in Biomedicine, **since 2007.**

ᑫ IEEE Transactions on Image Processing, one of the top journals in the field of Image Processing- **Impact Factor 2.8, 2004-2007;**

ᑫ IEEE Trans on Signal Processing, one of the top journals in the field of Signal Processing, **Impact Factor 2.35, 2005;**

ᑫ The International Journal of Computers & Geosciences, Elsevier, the official representative of Mathematical Geology, **Impact Factor- 2004: 0.903, 2001-2006.**

CONFERENCES:

ᑫ *IWCIA2012 – 2020 Workshop on Combinatorial Image Analysis- to be held in Check Republic- Publication by Lecture Notes in Computer Science – Springer Verlag, 2 paper* **2020;**

ᑫ *AMiTANs2018 – published by the American Institute of Physics, September 2018.*

✍ *10th-26th WSCG - International Conference on Computer Graphics, Visualization and Computer Vision 2004-2020, 2018 – 2 papers April 2018, 3-papers-2020*

✍ *15th -23rd IWCIA - International Workshop on Combinatorial Image Analysis-publishes by Springer Verlag LNCS —~ 4 papers per conf., since 2012 – present 2020*

✍ **2016, 2018 IEEE SSIAI** 2016, 6-8, March **2016,** Santa Fe, New Mexico, 5 papers, 6-papers.

✍ The 9th Inter Conference on Differential Equations and Dynamical Systems-**2015,**

✍ **ISSPIT 2014, IEEE** International Symposium on Signal Processing and Information Technology, Dec. 15-17, 2014 Jaypee Institute of Information Technology, Noida, India

✍ IEEE International Symposium on Signal Processing and Information Technology, **ISSPIT 2013**, Athens Greece, December 2013, Review 4 papers, **October 2013**;

✍ The 21th International Conference on Computer Graphics, Visualization and ComputerVision'2013 in co-operation with EUROGRAPHICS, **WSCG2013**, June 2013, Czech Republic, **3 Papers-April 2013;**

✍ 8th International Conference on Pervasive Computing Technologies for Healthcare, **20-23 May 2014, Oldenburg, Germany;**

✍ IEEE International Conf. on Image Processing, ranked #39 out of 3,500 Computer Science Conferences, ICIP 2010, 5 papers -2010, 4 papers 2011, 6 papers 2012;

✍ the IASTED International Conference on Signal Processing, Pattern Recognition and Applications (SPPRA 2011), 2010 – 6 papers; 2011 – 2 papers, 2012 – 4 papers;

✍ IEEE – ISSPIT symposium, IEEE International Symposium on Signal Processing and Information Technology, 2011 – 4 papers; 2012 – 6 papers, 2013 – 4 papers;

✍ 4th International Conference "Application of Mathematics in Technical and Natural Sciences", AMiTANs, 1 paper 2012, Varna, Bulgaria, July 2012;

✍ **IEEE – ISSPIT** symposium, IEEE International Symposium on Signal Processing and Information Technology**, since 2007.**

✍ "Appl. of Mathematics in Technical and Natural Sciences", Bulgaria, Euro-American Consortium for Promoting the Application of Math, August **2009, 2012;**

✍ **IEEE** Inter. Conference on Acoustics Speech and Signal Processing, April 2009, Taipei Taiwan, **ICASSP, 2009, #3 out of 3,511 CS conferences, Microsoft Research, on the base of citations**;

✍ Signal Processing, Pattern Recognition and Applications **(SPPRA)-ISTED, 2008-present.**

✍ The IEEE Int. Conference on Image Processing, **ICIP, 2006-2012, present, #39 out of 3,511 CS conferences, Microsoft Research, on the base of citations;**

✍ The 10-th – 25th International Conference on Computer Graphics, Visualization and Computer Vision, **WSCG2.** Czech Republic, since **2004-present, #441 out of 3,511 CS conferences.**

In Europe:

✍ The 5th Ibero - American Symposium on Pattern Recognition - SIARP2000, *Portugal,* September 2000.

✍ The Portuguese Conference on Pattern Recognition-RecPad2000, *Portugal,* May 2000.

✍ The VII Congress of Theoretical and Applied Mechanics, Sofia, *Bulgaria*, September 1993;

✍ The Journal Computers and Artificial Intelligence, Published by *Slovak Academy of Sciences.* 1991.

Review of a Computer Science Master Thesis for the Conference of Southern Graduate School Master Thesis Award 2006, November 2006.

REVIE RESEARCH PROJECTS PROPOSALS (dealing with image processing, 3D objects modeling and visualization) *for Natural Environmental Research Council,* Polaris House, North Star Avenue, Swindon SN2 1EU, *United Kingdom.* 2001.

EDITORIAL BOARD of the Journal of WSCG [ISSN 1213-6972], invited **October 2007.**

Scientific/Program Committees in the US, 2001-Present:

- ✓ *10th-26th WSCG - International Conference on Computer Graphics, Visualization and Computer Vision 2004-2021 – 2 papers per conference*

- ✓ *15th -23rd IWCIA - International Workshop on Combinatorial Image Analysis-publishes by Springer Verlag LNCS –~ 4 papers per conf., since 2012 – present 2022*

- ✓ *2016, 2018 IEEE SSIAI 2016, 6-8, March 2016, Santa Fe, New Mexico, 5 papers, 6-papers.*

- ✓ *Organizing Committee* Texas Section MAA 97 meeting, hosted by Department of Mathematics, Texas A&M University Commerce, March 30 –April 1st, **2017.**

- ✓ Organizing Committee The 9th Inter Conference on Differential Equations and Dynamical Systems, hosted by Department of Mathematics, Texas A&M U Commerce, May 2015

  - a) Member of the Local Host Committee; b) Member of the *Global Scientific Committee*

  - b) *Organizing and Chairing the special session:* Applications of Differential Equations and Dynamical Systems to Science and Industry

- ✓ IWCIA2015 – 17 Workshop Indian Statistical Institute, Kolkata, December **2015**, India.

- ✓ IWCIA2014 – 16 Workshop on Combinatorial Image Analysis- Member of the Program Com – Pub. by Lecture Notes in Computer Science – Springer, May 2014, Brno, Check Republic.

- ➢ IWCIA2012 – 15 Workshop on Combinatorial Image Analysis- Member of the Program Committee-Publication by Lecture Notes in Computer Science – Springer Verlag, Nov. 2012, UT at Austin, TX.

- ➢ Chairman Documentation Committee – SPDS2011, **Seoul, South Korea, June**, **2011**.

- ➢ IASTED- Int. Conf. on Signal Processing, Pattern Rec, and Appl. (SPPRA), since **2008 present**;

- ➢ IEEE Int. Symposium on Signal Processing and Information Technology, since **2008 present**;

- ➢ Technical Program Committee – IEEE International Conference on Image Processing (ICIP), top one in the field, **since 2006 present**.

- ➢ Program Committee of Image Processing and Computer Vision 2006- The 2006 World Congress in Computer Science Computer Eng, and Applied Computing, June 25-28, 2006, Las Vegas; http://www.world-academy-ofscience.org/worldcomp06/ws/IPCV/ipcv_committee

- ➢ Program Committee of The 10th World Multiconference on Systemic, Cybernetics and Informatics July, 2006 - Orlando, Florida, http://www.iiisci.org/wmsci2006/website/ProgramCommitte.asp

- ➢ Technical Program Committee – IEEE Int. Conf. on Image Processing, **2006-2012;**

- ➢ The 2005 International Conference on Modeling, Simulation and Visualization Methods- MSV'05, World Congress of Applied Computing: June 27-30, **2005;**

- ➢ The 2005 International Conference on Computer Vision - VISION'05: World Congress of Applied Computing: June 27-30, **2005;**

- ➢ the International Conference on Computer Graphics, Visualization and Computer Vision, WSCG, in co-operation with EUROGRAPHICS, since **2002-present;**

In Europe:

- ➢ Member of the Scientific Committee of 5th Ibero-American Symposium on Pattern Recognition - SIARP2000, Lisbon, *Portugal*, September 11-13, 2000;

- ➢ Member of the Program Committee of the 7th Congress of Theoretical and Applied Mechanics (CTAM), Sofia, *Bulgaria,* September 1993;

- ➢ Member of the Organizing Committee of the 6th CTAM, Druzba-Varna, *Bulgaria,* September 1989.

Chair sessions - International Conferences:

- ➢ Neural Networks and Learning, At the International Conference of Theory and Practice of Natural Computing, December 12-14, **2018**, Dublin, Ireland

- ➢ Special session: Appl. of Differential Equations and Dynamical Systems to Science and Industry, The 9th Inter Conference on Differential Equations and Dynamical Systems, Dallas Texas **2015**,
- ➢ IASTED- International Conference on Signal Processing, Pattern Recognition, and Applications (SPPRA), Austria, Innsbruck **2010**;

Session: APPLICATIONS IN MEDICAL IMAGING, the 2006 World Congress in Computer Science Computer Engineering, and Applied Comp, June 25-28, **2006,** Las Vegas;

Session: LOW- & HIGH-LEVEL SEGMENTATION + CLASSIFICATION + DETECTION, 2005 World Congress in Applied Computing - VISION'05, Las Vegas, June 20-23, **2005**;

Session: Image and Multidimensional Signal Processing, The 9th World Multi-Conference on SYSTEMICS, CYBERNETICS AND INFORMATICS), WMSCI 2005, Orlando, July 10-13, **2005**.

- ➢ Chairman of the session "Modeling and Identification", International Conference Modeling Identification and Control, Insbruck, *Austria,* February, 1992.

PUBLICATIONS:
Total number of papers: 161;
Number of peer reviewed papers: 120;
Books: 2.

CITATIONS:

Google Scholar – 685 citations, i10 index – 19, h index 14, 86 papers;

Microsoft Academic/ Microsoft Research-354 citations 50 papers;

Academia– 2700 citations
IEEE Xplore – *19 of my paper are posted by this Digital Library*.

[DBLP Bibliography Server](#) – *38 of my papers are listed*, Germany.

Keith Price Bibliography, Annotated Computer Vision Bibliography: 21 of my papers are posted by this Bibliography
FOUNDER RESEARCH GROUP: Worked on my ideas to reconstruct ore deposit and calculate its volume ahead of exploration. Several peer review papers published.
1. Dan Hack-HalsteadGeo Inc, Portland - Oregon, USA;
2. Dr. Marcin Iwanowski - Warsaw Univ. of Technology, Poland,
3. Rumen Mironov, Technical University Sofia, IPRL, Bulgaria.

Membership in Professional Societies:
IN THE US:
- IEEE member, *2003-present.*

- Mathematical Association of America-*2006-present.*

- Virtual Society for Multinational Studies of Aggregate Resources – Coordinator Prof. William Langer – U.S. Geological Survey, Denver Colorado, USA, since 1998;

International:
- Spatial Data Laboratory Network – Coordinator Prof. Chung Chang-Jo- Spatial Data Analysis Laboratory, Geological Survey of Canada, Ottawa, Canada, since 1998;

- Scientific Council of Bulgarian Association of Pattern Recognition-member of IAPR, since 1994;

- Bulgarian Association of Robotics, since 1987;

- Union of Bulgarian Mathematicians, since 1985.

Record of Research Projects:
IN THE US, 2002-Present:
- ⌨ Bradycardia Events Prediction and Evaluation - *University of Alabama at Birmingham, Dr. Arie Nakhmani, Ph.D. student Pravin Kandhare*, 2021 present;
- ⌨ Poisson Gradient Vector Field Covered Images Classification - *University Sorbonne Paris Nord, France, Dr. M. Luong, Ph. D. student Long Ngo; Texas A&M U –Commerce; A. Bowden, Mengzhe Chen 2020-present;*

- Clifford Algebra multi-vector coefficients calculation, Machine Learning with Clifford Support Vector Machines, *Yildiz Technical University, Istanbul, Turkey, Dr. Mutlu Akar, 2018-present.*
- Sparse Representation Classification in the Quaternion Wavelet Domain- *University Paris 13, France, Dr. M. Luong, E. Viennet, Ph. D. student Long Ngo,* 2017-present
- Tracking multiple objects in a video- *University of Alabama at Birmingham, Dr. Arie Nakhmani, Ph.D. student Pravin Kandhare, 2017 present;*
- Explosive containers automatic extraction from cluttered baggage and reconstruction – *Dr. Arslan, Chetana Divacar- Grad. Student, Texas A&M U –Commerce*, 2016- present;
- Clifford Algebras to classification, *Dr. Mutlu Akar, Yildiz Technical University, Istanbul, Turkey,* 2017-present;
- Skin lesion classification to benign, dysplastic nevi and melanoma - *Baylor University Medical Center Dr. Menter MD, Chief Dermatology Division, Dr. G. Hesler MD, Dr. Mete TAMUC* - 2015- present;
- Active Contours and Singular Points by Euler-Lagrange and Poisson Image PDEs for Image Segmentation and Objects Partitioning, *A. Bowden and Mengzhe Chen Graduate Student, Texas A&M U –Commerce*, 2014- present.
- Automatic skin lesion features extraction from images, skin lesion cancer identification – collaboration with Dr. Mete**,** Dr. Ou- TAMUC, Dr. Marie Luong-Univ. Paris 13, R. Selvaggi MD, **2010-present.**
- New Active Contour on the Euler-Lagrange Partial Differential Equation, **Dr. M Todorov**, Technical University, Sofia, Bulgaria**, 2013-2014,** using Euler-Lagrange and Poisson PDE – Mr. A. Bowden- Dept. of Mathematics, TAMUC-**2014-present.**
- Automatic Tracking Objects in Video, Dr. Arslan, Pravin, Kanthadare, **TAMUC, 2013 2014.**
- Convex Active Contours, skin lesion features extraction, collaboration with **Dr. M. Luong, University Paris 13, France, Dr. Tung Vietnam, 2011-2014.**
- Fire Arms Threat Assessment - collaboration with Dr. Attardo **2008 present**, Dr. Arslan -**2011- present**, Dr. Hempelmann **2012 present**; Dr. Blount, **2013 present.**
- Invariant Matching of objects using boundary geometric information, collaboration Dr. Arslan, since **2009.**
- Tracking neuthrophil in video sequences –**Dr. H. Kojouharov, UT at Arlington, 2009-2010.**
- Matching objects boundaries – collaboration with Dr. Arslan, **2009 presen**t;
- **Dr. Benito Chen-Chanpentier, and Dr. H. Kojouharov,** Dept. of Math **UT at Arlington**, In the field of Math Modeling of Bacteria Destruction by White Blood Cells, **since 2010.**
- Facial features extraction and emotions recognition, joint research with Dr. Mariofana Milanova, CS Dep. **University of Arkansas-Little Rock, Fall 2008.**
- New active convex hull model on the exact solution of the geometric heat diff. eq., **2008.**
- Image Database indexing in 2D and 3D, TAMUC, 2007-present;
- Automatic concavities extraction of image regions, joint research with Dr. Italo Simonelli, Dept of Math-TAMUC, Fall 2005-Spring 2006;
- Intelligent Image Database Mining Systems, Dr. Sang Suh, Dept of CS-TAMUC, 2005;
- Active regions – an approach to combine level sets with statistics, joint survey and research with Dr. Italo Simonelli, Dept of Math-TAMUC, Fall 2004-Spring 2005.
- An application of Image Processing to segmentation of Chemical Images, a joint survey with Dr. Ben Jang, Dept. of Chemistry, Spring 2005.
- Image object's motion interpolation, joint survey and study with Dr. Hasan Coskun, Dept. of Math-TAMUC, Fall 2004.
- A new convex hull model for image regions. An application to image database mining for image features extraction, indexing and management. TAMU Commerce, Dept of Math, Dept of CSIS,
- with the help of Dr. Richard Kreminski, Fall 2004.
- Biomedical Image Feature Extraction for Content Based Retrieval, PI Dr. Phillip Mlsna Elec. Eng. Dept. -NAU, USA. Funded by Department of Energy 2003-2004.
- Variational methods to 3D objects detection and visualization, Joint research with Assoc. Prof. John Nueberger, Math & Stat Dept., NAU, USA, 2004

- ⌨ Shape support, regularities and B-splines to image database querying. Joint research with Prof. James Swift, at Math & Stat Dept., Dr. Phillip Mlsna Elec. Eng. Dept. -NAU, USA.
- ⌨ Application of Heat Diff. Eq. to a new convex hull model for regions location in a dynamic image database. Joint research with Assoc. Prof. John Nueberger, Math & Stat Dept., NAU.
- ⌨ A new approach to increase accuracy of 2D sections interpolation. Joint research with Dr. M. Iwanowski, Warsaw University of Technology, Poland, R. Mironov, Technical Uni. Sofia.

In Europe:

- ✍ 2D sections interpolation, at Image Analysis Lab at CVRM, IST- Lisbon, *Portugal,* 2000-2001.
- ✍ Image enhancement and edge detection, IST-CVRM- Portugal, RFV- INSA, Lyon, *France,* 1999-2000.
- ✍ Geodesic sets definition in case of empty intersection, at CVRM, IST- Lisbon, *Portugal.* 2000.
- ✍ Image segmentation, at IAL - CVRM, IST- Lisbon, *Portugal,* 1998-1999.

Visualization and reconstruction Projects: IN THE US, 2001-Present:

- ✍ A new effective approach to volume calculation of 3D reconstructed subsurface objects. Under development together with HalsteadGeo Inc, Dr. Michel Fever Portland - Oregon, USA, Dr. Marcin Iwanowski - Warsaw University of Technology, Poland, 2002-Present.
- ✍ 3D Reconstruction and visualization of gravel deposit. Segmentation and 3D visualization of inclusions, together with HalsteadGeo Inc and Dr. Fever Portland, Oregon, US, 2001-2002.

3D Reconstruction and Visualization

- ✍ 2D/3D objects reconstruction and visualization using sparse data, at Image Analysis Lab (IAL) - C.V.R.M. -Instituto Superior Tecnico (IST), Lisbon, *Portugal,* 1999-2001;
- ✍ Multiple surfaces reconstruction and visualization, based on order and sequences of observation, at Institute of Mechanics (IM)-Bulgarian Academy of Sciences (BAS), *Bulgaria,* 2000;
- ✍ 3D reconstruction and visualization of multiple subsurface objects. Application to ore deposit and groundwater units reconstruction, at IAL-CVRM-IST, *Portugal,* 1998-1999;
- ✍ 3D modeling and visualization of flaws and cracks in plastic and non-plastic materials, with IM-BAS, 1996, 2001.
- ✍ 3D visualization using gray level image. Shape from shading, together with Technical University (TU)–Sofia, Dept. of Telecommunications, Image Processing and Recognition Lab (IPR), *Bulgaria,* 1998.
- ✍ Modeling, reconstruction and visualization of multiple, complex 3D objects. Branching problem. Overlapped objects. Surface visibility, *at IM-BAS,* 1994-1997;
- ✍ Pattern Recognition and Visualization to Material Reconstruction and Defectology, IAG-CVRM-IST, *Lisbon, Portugal,* 1993-1994.

Artificial Intelligence: Computer Vision and Decision Support Systems Projects:

- ⌨ Matching 3D reconstructed objects, together with CVRM-IST– Lisbon *Portugal,* 2001;
- ⌨ Shape matching of words in digitized Renaissance Books, together with IST-CVRM-Portugal, RFV- INSA, Lyon, *France,* 1999-2000;
- ⌨ 2D objects recognition to multiple complex 3D objects reconstruction and visualization and Image processing, together with IAL-CVRM-IST, 1995-1999.
- ⌨ 3D defects detection in mechanism components, IM-BAS, Bulgaria, CVRM-IST, *Portugal,* 1997;
- ⌨ Definition of the new notion Morphological Similarity and its application to 2D objects recognition and partitioning, at IM-BAS, *Bulgaria,* 1996.
- ⌨ 2D/3D objects modeling and recognition by single and multiple viewpoints, at Center of Mathematics Comp. Science & Mechanics-BAS, 1991-1993;
- ⌨ 3D modeling and recognition. New economic numerical algorithm to curvature calculation, at Slovak Academy of Sciences – Int. Lab of Artificial Intelligence, Bratislava, *Slovak Republic,* 1990-1991;
- ⌨ 3D objects recognition by sets and order of identification, at IM-BAS, 1988-1990.
- ⌨ Classification of objects in limestone cave, Artificial Intelligence Lab, Institute of Math – BAS, 1990.
- ⌨ Environmental Decision Support System for Analysis, Evaluation and Management of Groundwater Resources Based on Integrated GIS Technology, together with CVRM-IST, *Portugal,* 1997.
- ⌨ Decision Support System to 3D defects detection, together with CVRM-IST, *Portugal,* 1995.

Digital Libraries Projects:

- ▤ Automatic Feature Extraction and Recognition for Digital Access of Books of the Renaissance, at CVRM-IST, Lisbon, *Portugal, France,* 2000.
- ▤ Pages enhancements and segmentation to text and pictures, at CVRM-IST, Lisbon, *Portugal,* 2000.
- ▤ Multimedia Libraries, at Pattern Recognition and Image Proc. Lab –INSA, Lyon, *France*, 1999.
- ▤ Virtual Libraries – architectures, delivery and storage of contents, together with TU–Sofia, Dep. of Telecommunications, Image Processing and Recognition Group, 1998, 2000;
- ▤ Architecture, storage and transfer of contents, together with IPR-DT-TU, *Bulgaria*, 1999.

3D Modeling, Visualization:

- ✗ 3D modeling and recognition of objects in Nuclear Reactors, together with Russian Academy of Sciences, *Czech Academy of Sciences* (CAS), BAS, Bulgarian Nuclear Power Station "Kozlodui", 1987-1990.
- ✗ An optimal approach and software tool to robots local motions control, together with *Russian Academy of Sciences.* CAS, BAS, Bulgarian Nuclear Power Station "Kozlodui", 1987-1990;
- ✗ 3D objects recognition to robot orientation in a global scene, together with Polish Academy of Sciences-Institute of Biocybernetics and Bioengineering, Warsaw, *Poland,* 1987-1989.

Interactive Development Environment: MatLab, Mathematica, SURFdrive.

Programming Languages: Assembler, C++, Fortran, FORT.

SUPERVISING SOFTWARE DESIGN AND DEVELOPMENT PROJECTS:

- ▤ CNN for classification images with embedded vector field singular points- **2022-present, Oluwaseyi Igbasanmi;**
- ▤ CNN for skin lesion classification with ADAM-noise, SGD-noise learning methods – **2019 - present**
- ▤ Sparse Representation classification in quaternion wavelet domain – **2018 - present**
- ▤ SVMs for skin lesion classification in Clifford Algebra subspaces – **2018- present**
- ▤ Gradient Fields Singular Points for Automatic Geometric Features Detection -**2017 present**
- ▤ Automated Threat Containers Detection in Carryon Baggage – **2016- present**
- ▤ Tracking objects with SIFT, SURF, GM-PHD method – **2016 present**
- ▤ Active Contour using Euler-Lagrange and Poisson PDE, VFs with real and complex singularities- ELPAC –-**2014 - present**
- ▤ Tracking a single object with partial occlusions in a video - **2013**
- ▤ Tracking object with S-ACES and Modified Kalman Filter-**2012**
- ▤ Active Contour for noise surpassing, - **2011,**
- ▤ Rotational invariant objects matching – **2011.**
- ▤ Expanding active contours for tracking – **2010.**
- ▤ Rotational and scaling invariant regions matching – **2010.**
- ▤ Integral Active Contour Model, **2008- present.**
- ▤ Active Convex Hull Model, on the approximation and exact solutions, **Fall 2008.**
- ▤ Image Database indexing, **2008;**
- ▤ Video compression, Iris Recognition, **Fall 2008;**
- ▤ Stegonagraphy –**2007;**
- ▤ Corners detection for tracking objects- **2007;**
- ▤ A New Active Convex Hull model, 2004-2005, **Completed Fall 2008;**
- ▤ Image Segmentation guided by the Heat DE with elasticity features, REU, 2004.
- ▤ 3D Edge Detection and Visualization by Heat DE, *Mathematica* tool, REU, 2004.
- ▤ Heat DE with shells to image segmentation, NAU-Math and Stat Dept., 2003.
- ▤ Shape to support transformation, C++, run under Windows/NT, NAU, 2003.
- ▤ Image Database querying, shape features extraction and matching, NAU-Math & Stat Dept., **2002-2003.**

In Europe:

- ▤ Matching words in digitized Renaissance Books from 16 century. Run under Windows 95/98/NT, C++, Under European Community funded project DEBORA, 1999–2000;
- ▤ Matching 3D reconstructed subsurface objects. C++, 2000;

- ⌨ Multiple 2D/3D objects reconstruction and visualization. Windows 95/98/NT, C++,1998.
- ⌨ Filtering of 2D images. Run under DOS. Quick C. 1997;
- ⌨ Multiple 2D objects recognition and visualization. Run under DOS, Quick C, 1993-1994.

DEVELOPED SOFTWARE TOOLS:

- ⌨ ELPAC – AC based on the Euler-Lagrange Poisson differential equations; Generating VFs with real and complex singular points to cover images (Adam, Mengzhe, Oluwaseyi), 2014-present.
- ⌨ Convolutional Neural Network for Skin Lesion Classification (Reggi)- 2019
- ⌨ Active Contour (AC) based on the Heat PDE.
- ⌨ Capable of 3D objects recognition using stereo data. Motorola 6800, FORTH language, 86-89;
- ⌨ Capable of robot's local motions control. Motorola 6800, Assembler language, 1987;
- ⌨ Capable of generating (15,11) systematical, non-vasiliev's, non-linear, perfect codes correcting one error, Fortran, 1984.

Participation in Funded Projects and Grants in the US 2001-Present:

Title: **REU-NSF** project with TAMUC, Department of Mathematics, **2023-2026**, Senior Personal.

Title: Two GAR grants funded by the President of **Texas A&M University Commerce,** *In the Field* of Design of Vector Fields (VFs) with real and complex singularities and covering image databases with such VFs to enhance classification. Years: **2020; Fall2022 – Spring 2023, each grant ~25K** to support the GAR.

Title: Application of Clifford Algebra in Skin Lesion Diagnosis, **TUBITAK, $30,000,** funded the research of Dr. Mutlu Akar with me at Texas A&M University Commerce, 10.15.2018-10.14.2019.

Title: Clasification d'images par transformée en ondelettes quaternioniques et les algèbres de Clifford – Application à la classification d'images de lésions de peau et à la détection automatique de mélanome, **research at Univ. of Paris 13, Paris France**, June 16- July 15, 2019, ~$7,000 **Sorbonne Univ. Paris 13.**

Title: Delineation of Skin Cancer and Lesions by Filters Supported Active Contour, Research Enhancement Program, PI N.M. Sirakov, *$14,533*, **Texas A&M University Commerce**, PI, 2010-2011.

Title: "Enhancement and Features Extraction from Surface Images" –**REU NSF** funded project at Dept. of Chemistry, TAMUC, **Collaborator, 2006-2009**.

Title: 2D/3D Segmentation and Features Extraction for 3D Database Indexing and Content Based Image Retrieval, School of Graduate studies, Research Enhancement Grant, $ 14,728 **Texas A&M University Commerce, PI, 2007-2009**.

Title: Undergraduate Science-Mathematics Research Program Summer 2005 Introduction, granted by Dean of the Graduate School, $620 ,March 2005.

Title: Image segmentation for Content Based Image Retrieval. Mini Grant funded by Dean of Graduate Studies and Research, $520, Nov. 16. 2004-August 31.2005.

Title: Boundary support and its applications - Mr. Christopher Rex (my student in Math 192), funded -$384 by the Dean of College of Arts and Science, Undergraduate Student Research initiative;

Title: Biomedical Image Feature Extraction for Content Based Retrieval. PI Dr. P. Mlsna Elec. Eng. Dept. – NAU, **$43 000** funded by **U.S. Dept. of Energy** grant DE-FC08-01NV13974, 2004.

NSF-REU program 2004, Dept. of Mathematics – Collaborator - ~$12,000 supervising the research:

Title: A Method for Rapid Edge Detection and Image Segmentation, Michael Wells, Rice University, Dept. of Mathematics.

Title: 3D Edge Detection and Visualization based on the Geometric Heat Equation, Mathematics\Computer Science Department, Grove City College.

NSF-REU program 2003, Dept. of Mathematics – Collaborator - ~$12,000 supervising the research:

Title: An Application of the Heat Differential Equations to Image Processing, Catherine Lichten- McGill University;

Title: Objects Detection in an Image Database Using Shape Features, Andrey Kislyuk- UC Berkeley, 2003.

In Europe:

- ▪ Title: Digital Access to Books of the Renaissance, DEBORA, DGXIII/Telematics Program/LB-5608/A, 4th EU Framework, Participants: RFV-INSA, Lyon, France, CS Dept. - University of Lancaster-UK, CVRM-IST, Lisbon, Portugal, ~ 1 000 000 EURO, **Collaborator from CVRM-IST, 1999-2001.**

- Title: *Automatic Characterization of Ornamental rocks*, COSS - 4th EU Framework, University of *Bologna-Italy,* University of *Granada – Spain*, Instituto Superior Tecnico - *Portugal,* 1996-1998, Ranked the 35th best project completed during the 4th EU Framework;
- Title: *Development of manipulator and tools capable of Nuclear Reactors inspection.* Project № 3.1.7, *Czech* Academy of Sciences, *Russian* Academy of Sciences, and Institute of Mechanics-*Bulgarian* Academy of Sciences. 1987-1990. *Institute of Mechanics funded ~$1 000 000;*
- Title: *Biomechanics of Motions and Robots Control. Polish* Academy of Sciences-Institute of Biocybernetics and Bioengineering, Bulgarian Academy of Sciences –Center of Math. Comp. Sc. & Mechanics. 1986-1989, *$ 130 000 per year.*
- Group and differential-geometrical approaches to modeling and control of coupled-body mechanical systems, PI-Clementina Dimitrova Mladenova, 1997-1998.

Recently Submitted Grant Proposals:

- **Melanoma Research Alliance -** Title: Embedding Singularities in Skin Lesions for Machine Learning Classification, Budget ~$99,000, PI-Nikolay M. Sirakov, TAMUC, Collaborator Adam Bowden, Consultants- Rick Selvaggi M.D., Dr. Marie Luong Sorbonne Univ Paris Nord, Dr. Long H. Ngo– researcher Paris, France. Submitted 10.31.2022.
- **Melanoma Research Alliance - November 12, 2021, amount required as a direct cost -$97,114,** Title: Melanoma Prediction with Machine Learning of Skin Lesion Singularities, submitted, PI Dr. N. M. Sirakov, Co-Investigators Adam Bowden, Consultants- Dr. Marie Luong, Dr. Long H. Ngo – Sorbonne University of Parris 13.
- **Melanoma Foundation – February 28, 2019, amount requested – Direct Cost $**130,722.00
Title: Applying Deep Learning to Design Rules for Clinical Melanoma Diagnosis
PI. Dr. N.M. Sirakov, Co-Investigators Dr. M. Mete, Mr. Adam Bowden

- **Amazon Research Award – amount requested –** Direct Cost $ 65,400 for 1 year. **PI** – Dr. N.M.Sirakov, Co-PI Dr. Arie Nakhmani, Dept. of Electrical and Computer Engineering, School of Eng., U. of Alabama at Birmingham (UAB), PhD student P. Kandhare Interdisciplinary Eng. UAB.

  - Interdisciplinary Engineering PhD
Title: Model Invariant Visual Tracking with Deep Learning from Trajectories

 - **NSF Converging Prospectus - April 30, 2018**
Title: Transdisciplinary research to develop photoswitch probes to study epigenetic modification regulated by non-coding RNAs, **Senior Personal:** Larry Lemanski, S. Saffer, N. Sirakov, L.Angel, H. Park, A. Arslan, J. D. Acevedo, K. Parameshwaran, I. Khan, Z. Zhao and Y. Rodriguez.
- **Melanoma Foundation – February 28, 2018, amount requested – Direct Cost $**114,942.00, **Total: $172,713,** after 1 Excellent and 2 very good reviews, revision for Feb. 2019, submission.
Title: Automated Quaternary Melanoma Prediction, Diagnosing Clinical Rule Design
PI. PI Dr. N.M. Sirakov, Co-Investigator Dr. M. Mete, **Baylor University Medical Center -** Research Associate J. Frieder MD, Co-PI Assistant Professor So Yeon Paek, MD.

- **NIH, R-01, National Cancer Institute – amount requested ~ $700, 000, 02.03.2017**
Title: A Novel Automated Dermoscopy-Based Image Analyzer for the Clinical Evaluation of Pigmented Lesions and Early Detection of Melanoma, **Baylor University Medical Center, PI. Dr. A. Menter**, Co-Invest: Dr. J. Griffin MD, J. Frieder MD, L. Dickens MD, Dr. G. Hesler MD, TAMUC- **PI Dr. N.M. Sirakov**, Co-Invest. Dr. M. Mete.

   - **Department of Homeland Security, ALERT -** amount requested for 2 years- $141,620
Title: X-Ray and CT Baggage Images Segmentation for Potential Explosive Containers Extraction Reconstruction and Recognition, PI. Dr. Sirakov, In Collaboration with Dr. A. Arslan, TAMUC, Surendra Chakrader Nara**,** Database Software Developer**,** Infosys Solutions Inc, Sub. July 01, 2016.

- **NIH – R03 – amount requested $132,000,**

Title: Novel System for Dysplastic Nevi and Melanoma Diagnosing and Prediction, PI-Dr. N. M. Sirakov, Co-Investigator Dr. M. Mete-TAMUC, Co-Investigator Dr. A. Menter, MD, Dermatology Division Baylor U Medical center, Co-Investigator Dr. J. Griffin MD, February 26, 2016.

- **DARPA**-BAA-14-39 amount requested **$1,140,000,**

Title: Automatic Visual Recognition, Tracking, and Semantic Analysis Of Firearms with The help of A Firearm Ontology, PI A. Arslan, Co-PI Dr. S. Attardo, Co-PI C. Hempelmann, Co-PI G. Blount, **Co-PI N. M. Sirakov, June 2015.**

NSF- Proposal for funding The 9th International Conference on Differential Equations and Dynamical Systems, PI Dr. T. Wang, **Co-PI Dr. N.M. Sirakov, November 17, 2014. Budget Required: ~$20,000**

- **R03-PA-13-304**-October, 16, 2014, Budget requested: **$139,000,**

Title: Validation of New Rules for Melanoma Identification, PI Dr. N. M. Sirakov, *Co-PI: Dr. Menter, Baylor University Medical Center;* Co-PI Mutlu Mete, Consultant Dr. Marie Luong, Rick Selvaggi, MD.

- **NSF 12-502,** Budget requested **$777,454**

Title: ATD: Ontology-Based Automated Threat Detection in Public Spaces, **PI Dr. N.M. Sirakov,** Co-PI Dr. S. Attardo, Co-PI Dr. A. Arslan, Co-PI Dr. C. Hampelman, **Jan. 08, 2013.**

NIH PAR-12-144-R03-: $135,997-**Title:** Active Contours Extracted Feature Vectors and Geometric Structures for Support Vector Machine Based Skin Cancer Diagnosis, 2years, **PI, N.M. Sirakov,** Co-PI Dr. M. Mete, Rick Selvaddi MD, Dr. Luong **U. Paris 13,** Dr. Thieu **National Institute of Applied Mathematics Vietnam,** submitted **July 16, 2013.**

NSF-REU, Department of Mathematics, PI Dr. T. Wang, Co-PI Dr. Y. Ou, **Senior Personal Dr. N.M. Sirakov,** Dr. H. Coskun, submitted **August 2013NSF-REU,** Department of Mathematics, PI Dr. T. Wang, Co-PI Dr. Y. Ou, **Senior Personal Dr. N.M. Sirakov,** Dr. H. Coskun, submitted August **2013.**

NIH- PAR-12-144-R03 - $135,000, **Title:** Active Contours' Extracted Feature Vectors and Geometric Structures For Support Vector Machine Based Skin Cancer Diagnosis, PI Dr. N.M.Sirakov, Co-PI, Dr. M.Mete, Dr. Y. Ou, Consultants, R. Selvaggi, M.D., Dr. Luong, Ph.D. student Thieu, **October 2012**

NSF-China-Title: Image Segmentation by contours driven by a water pressure. PI, Wenjun Huang, Associate Professor, Guangxi University for Nationalities, China, **April 2012.**

NIH – PA-10-062_R03, $150 000: Title: Mathematical and Computer Modeling of Implant- Associated Infection, $150 000, two year, in collaboration with UT Arlington, Dept. of mathematics, Dept. of Bio Eng., Dr. Hristo Kojouharov, **TAMUC**-PI Dr. Nikolay Sirakov, **Feb. 24, 2012.**

NIH-R15-PA-10-070, $399,000, Title: Skin Cancer Identification Using Active Contours' Extracted Features and Geometry of Manifolds, PI-Dr. N. M. Sirakov, Co-PI's- Dr. M. Mete, Dr. Y. Ou, Consultant Dr. Karina Parr, Scott and White Memorial Hospital, Texas A&M Health Science Center, submitted, **February 24, 2011. Revised after Review and resubmitted October 20, 2011.**

NHARP - $147,000- Title: Mathematical and Computer Modeling of Neutrophils Destruction of Bacteria on Medical Implants, Collaborative grant proposal with **Dept. of Mathematics, UT Arlington**-PI Dr. Hristo Kojouharov, **TAMUC**-PI Dr. Nikolay Sirakov, *approved for full proposal in a review panel with a rate of acceptance less than 25%, November 2009.*

FEDERAL Initiative- $1,771,964-Title: Center for Patterns and Abstractions Discovery in Image Collections, *Submitted October 01, 2009, PI. Dr. Sang Suh, CS Dept. Texas A&M U Commerce.*

NEH $250,000- Title: New Approaches to Digitizing Native American Archival Materials, Milanova Mariofanna - Project Director US – Associate Prof., **Univ. of Arkansas at Little Rock** , Parins James - Associate Director of the **Sequoyah National Research Center**, CO-PI-Little Rock Arkansas , Sarakov Nikolay - Assistant Professor , PI-**Texas A&M University,** Mehdi Qasim- Project Director UK - Professor of the **University of Wolverhampton –UK,** Kountchev Roumen – Professor- Consultant, **Technical University of Sofia, Bulgaria**. *Submitted July 10, 2009.*

NSF, CDI-Type II: Visual Attention Models for Image Exploration, In Collaboration with: PI Assoc. Prof. Mariofna Milanova, U of Arkansas at Little Rock, Derrick Tate, Assistant Professor, Mechanical Engineering Department, Texas Tech University, Ahmed Emam, Assistant Professor, Department of Computer Science,

Western Kentucky University, Professor Qasim H. Mehdi, University of Wolverhampton, UK. *Submitted on January 08, 2008,*

NSF CAREER Proposal- CAREER- Title: 2D/3D Dynamic Image Database with Learning Visualization and Tracking,. amount requested $**482,540**, *Submitted on July 17,2007,* Denied on November 19, 2007 after 6 reviews (3 good; 3 fair) by experts and 2 reviews by NSF panels;

NSF CAREER Proposal- CAREER- Title: Decisions Support-Content Based Image Retrieval System, DS-CBIR**,** amount requested $501,159, *Submitted on July 2006*;

Title: Intelligent Utilities for Brain Cancer's Features Extraction from Image Database, amount requested $96 672, PI Dr. Sirakov, together with Dr. Ye-Lin Ou, *submitted to the Advanced Research Program – Texas, 2007.*

Title: Diagnosis Support-Content Based Image Retrieval System, DS-CBIR amount requested $97000, PI Dr. Sirakov, together with Dr. Simonelli, Dr. Creider, *submitted to the Advanced Research Program – Texas, 2005.*

Title: Automatic Objects Location and Tracking in Image Sequences, together with Dr. Simonelli, amount requested $26850, PI Dr. Sirakov, *Fall 2005, submitted to L-3 Communication;*

Title: 3D Objects Reconstruction and Visualization, amount requested $ 28 075, *Fall 2005, submitted to L-3 Communication;*

Title: Image Database management, features extraction to Content Based Image Retrieval, Dr. Simonelli, amount requested $26850;

Title: Summer Undergraduate Research Program-TAMUC, together with Dr. Allan Headley, Dr. Ken Ashley, Dr. Ben Jang, Fall 2004-Spring 2005, funded for Summer 2005.

Awards and Recognitions:

1. **Best Paper Award -** Oluwaseyi Igbasanmi, Nikolay M. Sirakov, and Adam Bowden, CNN for Efficient Objects Classification with Embedded Vector Fields, ICCIDA2023, **July 21-22,2023**, *accepted for publication by the Springer book series, Studies in Computational Intelligence,* Electronic ISSN 1860-9503, Print ISSN 1860-949X,

2. **2nd place winner in mathematics. Title:** An Artificial Intelligence Based Driving Environment Descriptor: Voice Alerts to Drivers, 15th TAMU System Pathway Students Symposium, Nov. 01st, 2018, West A&M U, Elisha Shachar, **Supervisor** N.M. Sirakov

3. **1st PLACE WINNER IN MATHEMATICS, Title:** Singular Points of the Gradient Field of the Poisson Partial Differential Equation Solution on an Image, TAMU System Pathway Students Symposium, Nov. 03, 2017, Tarleton State University, **talk** Master Student Mengzhe Chen, supervisor **Nikolay Sirakov,**

4. **3RD PLACE WINNER IN MATHEMATICS, Title:** Automatic Detection of Moving Targets in Video, TAMU System Pathway Students Symposium, Nov. 03, 2017, Tarleton State University, **talk** Tsitsi Msabaeka, co-authors Janessa Beach, Laura Beene, Supervisor: **Nikolay M. Sirakov**

5. **Rajesh Shanmuga Sundaram –** my research student received first prize at **lion's innovation showcase** event November 21, **2015**.

6. **Recipient of the TAMU** Research, Scholarship, and Creative Activities– *"Unfettered Thought"* 2015;

7. **Lockheed Martin Best Paper Award** on the Automatic Targets Recognition-SPIE Defense Security and Sensing paper:
   Arslan, Abdullah N., Christian F. Hempelmann, Carlo Di Ferrante, Salvatore Attardo, and **Nikolay Metodiev Sirakov**. 2013. "From Shape to Threat: Exploiting the Convergence Between Visual and Conceptual Organization for Weapon Identification and Threat Assessment." Invited Paper. Recipient of the Lockheed-Martin Best Paper Award. In: Sadjadi, Firooz A. and Abhijit Mahalanobis. Eds. Automatic Target Recognition XXIII. Proceedings of SPIE 0277-768X, V. 8744. Bellingham, WA: SPIE. 87440P. pp. 1-15. doi: 10.1117/12.2015591.

8. Texas A&M System Teaching Excellence Award Recipient **2011**;

9. Texas A&M System Teaching Excellence Award Recipient **2010**;

10. Chakrader Nara, N.M. Sirakov, 2nd Place **TAMUC** Research Sym. April 01, 2011;

11. *Venkata Nagendra Raja Jadandhyam,* 8th Annual Texas A&M University-System Pathways Research Symposium, West Texas A&M University, October 22-23,2010, **Overall Winner, Master's Level, 2nd Place & 1st Place Winner Mathematics** Discipline, **Title:** Correlation and Shape Matching Methods between Images;

12. *Surendra Chakrader,* 8th Annual Texas A&M University-System Pathways Research Symposium, West Texas A&M University, October 22-23,2010, **Master's Level, 2nd Place, Computer Science, Title:** Enhancement of Skin Lesion Images to Remove Noise.

13. My paper-Heat Equation to 3D Image Segmentation was **Ranked in the top 10% of the papers** Presented on 9th World Multiconference on Systemics, Cybernetics and Informatics (WMSCI 2005).

14. NAU Dept of Mathematics and Statistics annual review committee awarded to me best research for 2001-2002 academic year with grade 4 out of 4; 2002-2003 year with 3.95.

Commerce, Texas
December 21, 2023