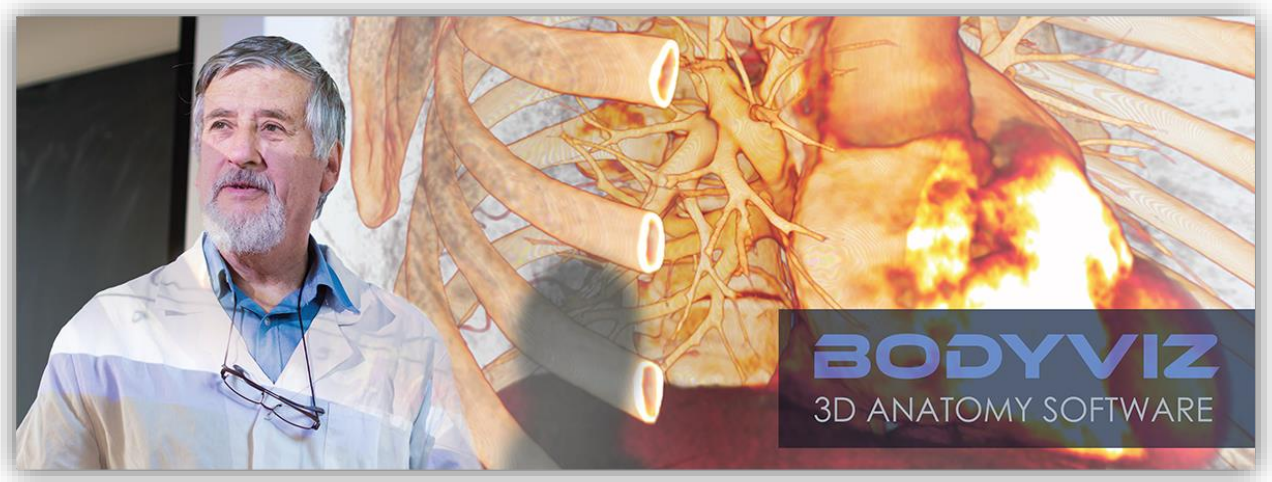

IMPROVING EDUCATION WITH VIRTUAL ANATOMY

Proposal Prepared for

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FLORIDA ATLANTIC UNIVERSITY
CHARLES E. SCHMIDT COLLEGE OF MEDICINE

Boca Raton, FL

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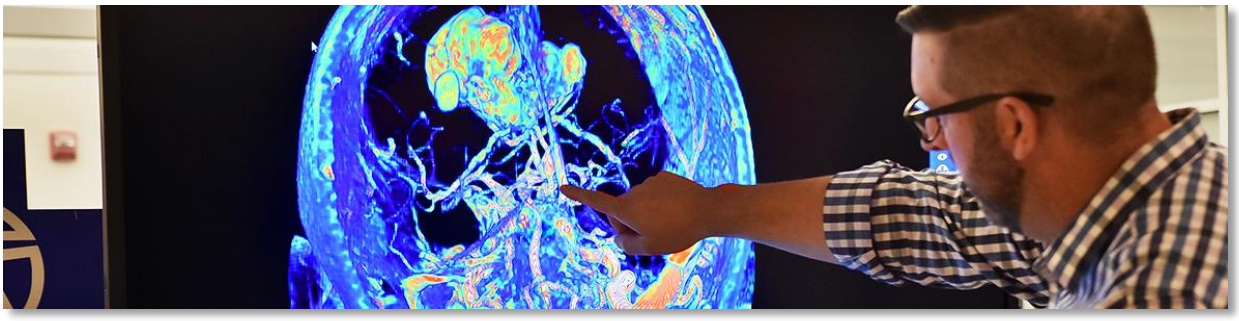

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EXECUTIVE SUMMARY

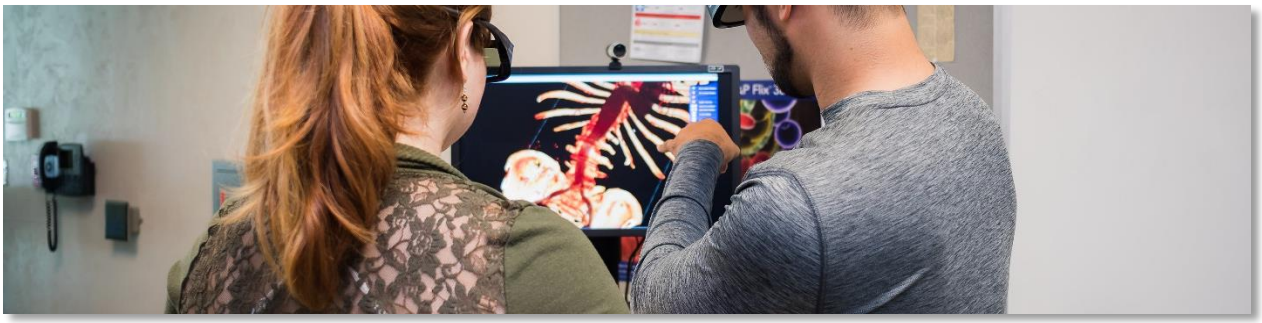
BodyViz is the difference of working in 2D and guessing, and working in 3D and knowing.

Thomas A. Aloia, MD, FACS,
Assistant Professor,
Department of Surgical Oncology, Division of Surgery
The University of Texas, MD Anderson Cancer
Houston, TX

Institutions such as yours understand that traditional teaching methods and anatomy curriculum are not providing students needed exposure to real anatomy. By integrating BodyViz anatomy software into your anatomy curriculum, you have the opportunity to provide students limitless access to real anatomy using a flexible, easy-to-use platform.

As a BodyViz client, you will have a dedicated client Success Coach that will provide training and show you how to use BodyViz in lesson planning, answer software and curriculum questions, and provide software and scan updates. You will quickly become proficient, productive, and confident with BodyViz.

We know that institutions like yours are constantly improving. We are positioned to support you well into the future. Your BodyViz solution will easily adapt, move, and scale to meet changing enrollment, staffing, and curriculum.



IMPROVEMENT PLAN

Two-dimensional illustrations simply can't convey the complex spatial relationships between anatomical structures that students need in order to master anatomy. Models simplify the intricacies and natural variations of real anatomy. And for many institutions, providing access to cadaver labs and clinical experiences is limited, expensive, and, in some cases, impossible. Regardless, students need to be actively investigating real anatomy: observing, questioning, exploring, making comparisons, evaluating data, and communicating and defending conclusions.

> BodyViz allows students to visualize often abstract anatomical concepts that more traditional images cannot adequately capture, such as relationships between organs or the effects of an abnormality on surrounding structures.
>
> *Lori Hensley, Ph.D.*
> *Associate Professor and Chair Biology*
> *Ouachita Baptist University*

BodyViz allows students a unique sense of discovery while they investigate real patient data, making their learning experience more meaningful. As a direct consequence BodyViz enables students to retain more information and improve their understanding, and instructors need less time to teach complex anatomical structures.

Teach anatomy using real anatomy

With BodyViz, students and instructors easily manipulate and explore human anatomy, perform virtual dissections, collaborate and share content, annotate anatomical features, review lessons, and plan procedures. Rendered from MRI and CT scans, the visualizations in the BodyViz library represent the entire human body from head to toe and empower instructors to teach anatomy using real anatomy. Your institution will have access to over 600 scans in the BodyViz library, including 31 full cadavers scans donated by the University of Utah.

Learn in interactive 3D

Research on the learning benefits of using 3D visualizations in the classroom is ongoing, but early findings indicate that focus, attention span, information retention, classroom behavior, and achievement improve.

At Idaho State University, students receive expanded access to real anatomy through a virtual cadaver lab.

In a study conducted by researchers from the International Research Agency, students were tested before and after a lesson. The control group was exposed to traditional resources only and the experimental group instruction included via an interactive 3D lesson. On average, 34% more pupils in 3D classrooms achieved higher test results. The study also found that attention levels rose significantly, with 56% more of the class paying attention during the 3D lessons compared to the traditional learning environment.

Combine virtual dissection with cadaver and animal dissection

For future planning or expansion to the medical school it is helpful to know that even when institutions have access to cadavers, many schools are using to 3D visualizations of CT data to expand access to real anatomy, and published research indicates the strategy works. In a 2016 article published in *European Radiology*, researchers tested the outcomes of learning success when cadaver CT scans and virtual dissections were included in general anatomy instruction. Study results indicated medical student performance "significantly improved" when 3D visualizations and virtual dissection supplemented cadaver lab, leading researchers to conclude that "medical imaging and virtual dissection should therefore be considered to be part of standard curriculum of gross anatomy." Several of our clients that do not have access to human cadavers use BodyViz to supplement animal dissection.

Enhance curriculum

BodyViz empowers instructors to use real anatomy as the foundation of their curriculum. BodyViz 3D anatomy visualizations are created directly from CT and MRI scans. Interacting with the visualizations is intuitive and easy. Users can:

Screen shot of a BodyViz 3D visualization rendered from real patient data.

- Rotate, pan, zoom, and fly through virtual anatomy
- Perform virtual cadaver dissections
- Create “clipping” and “slicing” planes for in-depth examination of anatomy
- Highlight specific anatomical features using color contrast
- Select, examine, and remove tissues based on density and type
- Mark and annotate pathology within the visualization
- Compare two visualizations side by side
- Insert and manipulate trocars to simulate surgical instrument paths
- Load and examine specific patient data

BodyViz anatomy visualizations transform anatomy courses from a passive experience into an engaging, interactive field of study.

BodyViz anatomy software and curriculum supports introductory lesson plans as well as case-based and problem-based learning curriculum, giving instructors the flexibility to add, modify, and customize content.

Education institutions scale BodyViz to meet students where they are, providing access to dynamic learning experiences in a format that advances learning objectives—in classrooms, libraries, auditoriums, and individual study spaces.

Build a BodyViz solution

The BodyViz team works closely with clients to build a solution that meets the client's unique objectives, course offerings, and student population. A solution consists of a combination of software licenses and hardware. BodyViz easily integrates with existing AV infrastructure and anatomy curriculum. Institutions purchase anywhere from a single license to 100+ licenses depending on their objectives. The BodyViz team also makes sure clients have the training and resources needed to meet their goals.

Budgeting for your project

BodyViz solutions can be configured with any combination of licenses and hardware depending on the scale of your project. Over the next couple weeks, we will work together to tailor your BodyViz solution directly your goals. Final pricing will be dependent on

- Hardware configuration (portable vs. permanent installations)
- Project scale
- Annual upgrades and support
- Turnkey solution services

Plan for integration

BodyViz has extensive experience in managing the entire implementation process including solution planning and design, software installation, and customer training. We closely partner with our clients to manage implementation and follow a time-specific project plan detailing project steps, timeframes, and the responsible parties.

After the solution is fully implemented, your institution will continue to benefit from the high-quality support. BodyViz believes the best long-term relationships are anchored in the knowledge that we WILL be there to support you, anytime, anywhere.

Achieve success

We are dedicated to prompt resolution of any issues that may arise, believing that our clients are our strongest resource, and their long-term satisfaction is the only factor that ultimately determines our success. Every BodyViz client receives support from a dedicated Success Coach. Your Success Coach has the experience, tools, and technology at their disposal to quickly and efficiently diagnose and resolve issues. Success Coaches are supported by a larger team of experts, including BodyViz executive leadership, to ensure that all issues are resolved to the client's expectations.

Instructors, students and the BodyViz integration team prepare the University of Texas Health Science Center at San Antonio's virtual anatomy lab.

RECOMMENDED SOLUTION OPTIONS FOR

FAU – CHARLES E. SCHMIDT COM

SOLUTION OPTION #1

Software, Services and Hardware	Unit Price	#	Line Total
BodyViz Laptop/PC Software For use in lab, lecture and content creation.	$6,995	6	$41,970
BodyViz Training, Support & Implementation Services Includes all training, support, implementation, upgrades/enhancements, and access to the BodyViz scan library, as well as BodyViz Sync for iPad integration, allowing instructors to send scans to student iPads for visualization. The BodyViz app is available for free on the App Store. Your institution will be assigned a BodyViz Success Coach to facilitate the agreement.			$19,995
BodyViz Compatible Laptop Operating System: Windows 10, Processor: Intel® Core™ i7 (or similar), Memory: 16 GB RAM, Graphics: NVIDIA® graphics with minimum 4 GB dedicated memory. Includes Xbox controller.	$2,495	6	$14,970
		BodyViz Solution Total:	**$76,935**

SOLUTION OPTION #2

Software, Services and Hardware	Unit Price	#	Line Total
BodyViz Laptop/PC Software For use in lab, lecture and content creation.	$6,995	3	$20,985
BodyViz Training, Support & Implementation Services Includes all training, support, implementation, upgrades/enhancements, and access to the BodyViz scan library, as well as BodyViz Sync for iPad integration, allowing instructors to send scans to student iPads for visualization. The BodyViz app is available for free on the App Store. Your institution will be assigned a BodyViz Success Coach to facilitate the agreement.			$16,995
BodyViz Compatible Laptop Operating System: Windows 10, Processor: Intel® Core™ i7 (or similar), Memory: 16 GB RAM, Graphics: NVIDIA® graphics with minimum 4 GB dedicated memory. Includes Xbox controller.	$2,495	3	$7,485
		BodyViz Solution Total:	**$45,465**

SOLUTION OPTION #3

Software, Services and Hardware	Unit Price	#	Line Total
BodyViz Laptop/PC Software For use in lab, lecture and content creation.	$6,995	2	$13,990
BodyViz Training, Support & Implementation Services Includes all training, support, implementation, upgrades/enhancements, and access to the BodyViz scan library, as well as BodyViz Sync for iPad integration, allowing instructors to send scans to student iPads for visualization. The BodyViz app is available for free on the App Store. Your institution will be assigned a BodyViz Success Coach to facilitate the agreement.			$14,995
BodyViz Compatible Laptop Operating System: Windows 10, Processor: Intel® Core™ i7 (or similar), Memory: 16 GB RAM, Graphics: NVIDIA® graphics with minimum 4 GB dedicated memory. Includes Xbox controller.	$2,495	2	$4,990
		BodyViz Solution Total:	**$33,975**

BodyViz Curriculum Mapping & Content Integration Through a Statement of Work (SOW) agreement, BodyViz will provide curriculum mapping, custom content creation including interactive learning modules, and integration with LMS. Detailed SOW will be developed by BodyViz in collaboration with your institution and will determine final price.	TBD

PLATFORMS AND SERVICE

> BodyViz is exciting. It is cutting edge. It sets us apart from other community colleges. We are using it in biology and health sciences classes. This has been a huge enhancement for my students, especially in situations when we don't have cadavers to dissect.
>
> *Martie Heath-Sinclair, MS*
> *Natural Science Instructor*
> *Hawkeye Community College*

BodyViz's proprietary rendering engine quickly transforms 2D MRI and CT scans into 3D visualizations. These visualizations are fully interactive and easy to use. To expand access, institutions extend BodyViz to iPads using BodyViz Sync.

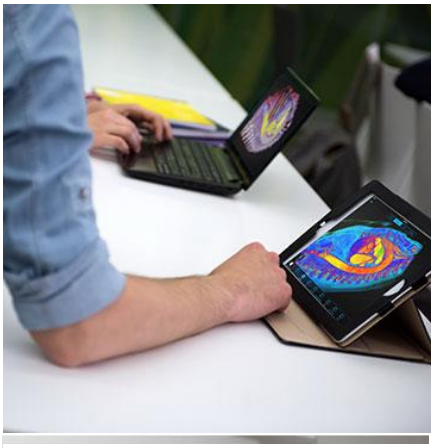
BodyViz comes with a complete library of visualizations that includes cadaver scans, normal anatomy, and abnormal pathology. In addition, instructors, physicians, and surgeons can easily load and render their own 3D visualizations from specific patient data.

A BodyViz software license

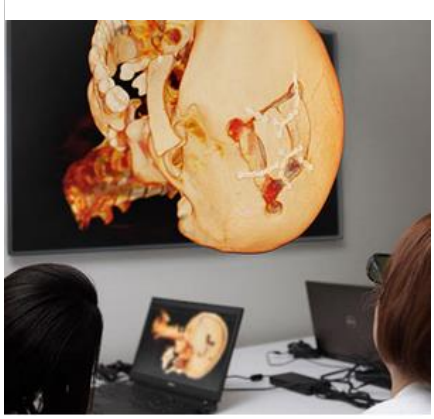
A BodyViz software license gives users the power to:

- Interact with 3D MRI and CT scan visualizations
- Quickly and easily load scans into the library
- Create and annotate BodyViz content
- Easily integrate virtual anatomy into curriculum

BodyViz Software for laptops and PCs



Sync and BodyViz App for iPads



BodyViz Stereoscopic

BodyViz Sync

BodyViz Sync enables iPads to download BodyViz content. Using BodyViz Sync, instructors load visualizations from their computer into the BodyViz Cloud. An iPad with the BodyViz app and appropriate permissions can access content. The touch screen on the iPad allows for easy exploration of real patient data.

BodyViz Stereoscopic License

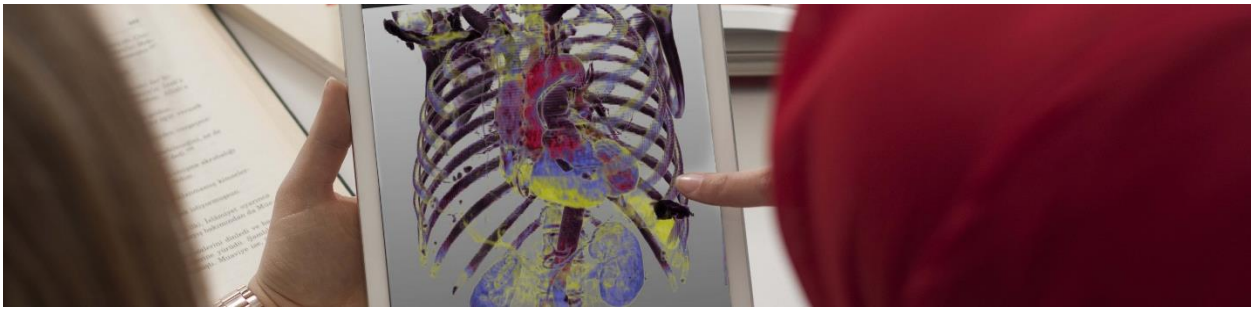
Viewed in stereoscopic, the visualizations appears to pop out of the screen, providing the user with a virtual experience that enhances the ability to analyze and absorb complex spatial relationships. Stereoscopic licenses are used in conjunction with 3D stereoscopic projection systems and stereoscopic compatible panel displays like 3DTV.

Annual Upgrades and Support Agreement

As part of the annual upgrade and support agreement, your institution will be assigned a Client Success Coach. Your Success Coach will proactively provide you with all upgrades and software enhancements, new studies as they are added to the BodyViz library, ongoing support with curriculum integration, answers to your software questions. Annual upgrade and support fees are based on the amount of software included in your BodyViz solution.

HARDWARE REQUIREMENTS AND RECOMMENDATIONS

	HIGH-PERFORMANCE	RECOMMENDED	MINIMUM
Processor	Intel i7 Quad core processor or equivalent	Intel i5 Quad core processor or i7 Dual core processor or equivalent	Intel i5 Dual core processor or equivalent
Hard Disk	Solid State Drive (SSD) 512 GB or higher	512 GB of free hard disk space for software, supporting libraries, and imaging data.	256 GB of free hard disk space for software and supporting libraries. Additional hard disk space will be needed for imaging data.
RAM	16 GB or higher	16 GB	4 GB (Windows 7) 8 GB (Windows 8 or 10)
Graphics	**Mono:** dedicated video graphics card with 8 GB video memory or higher.	**Mono:** dedicated video graphics card with 4 GB video memory.	**Mono:** dedicated video graphics card with 2 GB video memory.
	Stereo: Nvidia Quadro video graphics card with 8 GB video memory or higher.	**Stereo:** Nvidia Quadro video graphics card with 4 GB video memory.	**Stereo:** Nvidia Quadro video graphics card with 2 GB video memory.
	Note: on-board graphics such as Intel Graphics Controllers **DO NOT** meet the minimum specification.	**Note:** on-board graphics such as Intel Graphics Controllers **DO NOT** meet the minimum specification.	**Note:** on-board graphics such as Intel Graphics Controllers **DO NOT** meet the minimum specification.
Operative System	64-bit Windows10 Professional	64-bit Windows 8 or 10 Professional	32-bit Windows 7 Professional
Controller Unit	Microsoft Xbox One wired or wireless controller with USB PC adapter (Use of wireless depends on your facility's RF emissions)	Microsoft Xbox One wired or wireless controller with USB PC adapter (Use of wireless depends on facility's RF emissions)	Microsoft Xbox One wired or wireless controller with USB PC adapter (Use of wireless depends on facility's RF emissions)



ABOUT BODYVIZ

In 2007, BodyViz was founded by pioneers in virtual reality, prominent professors Jim Oliver and Eliot Winer, after they developed an algorithm to simply and quickly render MRI and CT data into 3D visualizations using off-the-shelf hardware. They collaborated with world renowned laparoscopic surgeon, Thom Lobe and early in 2008 recruited serial entrepreneur Curt Carlson as CEO. Curt has a proven record of building successful ventures from innovative technologies developed at research universities. Together they worked tirelessly to make patient imaging data accessible and meaningful to a broad base of users through computer visualization.

Early on, the team identified a paradigm shift occurring in healthcare and education. Educators, healthcare providers, and researchers need to communicate complex anatomical and medical concepts in a way that is easy to understand for a wide variety of audiences. The advancements in imaging have exponentially increased the amount of medical information available, but, the data remained locked up in radiological silos. Driven by a vision to unlock this data and the 3D spatial relationships contained within, the BodyViz team refined the original innovation into interactive anatomy software made for instructors, students, medical professionals, and consumers.

Instructors in the virtual anatomy lab at University of Texas Health Science Center at San Antonio experience the power of BodyViz stereoscopic.

CEO AND FOUNDERS BIOGRAPHIES

Curt Carlson
President & CEO

Curt Carlson is a seasoned “serial” entrepreneur providing extensive CEO leadership, software sales and software development experience in commercializing tech-transfer technologies. He has spent over 25 years building tech-transfer companies via the ISU Research Park. In order to execute on a given tech-transfer commercialization opportunity, Mr. Carlson surrounds himself with a management team of industry specialists. He leads and is an integral part of BodyViz’s sales and marketing and product development efforts.. Mr. Carlson is a board member of the Iowa Innovation Council and a former board member of the ISU Research Foundation.

James Oliver, PhD
VP Operations & Software Support
BodyViz Founder

Dr. Oliver holds the title of University Professor at ISU and serves as Director of ISU’s Virtual Reality Applications Center (VRAC) and its Interdepartmental Graduate Program in Human Computer Interaction (HCI). Dr. Oliver’s current research, teaching and economic development activities involve a wide array of human computer interaction technologies. Previously, Dr. Oliver served as Vice President of Product Development at Cognicity, Inc. a Twin-Cities startup, focused on Internet-based entertainment marketing. From 1997-2000, Dr. Oliver headed product development for Engineering Animation Inc. (NASDAQ: EAII), where he led the creation of a unique Internet-based visual collaboration tool for supply chain integration.

Eliot Winer, PhD
VP Software Development
BodyViz Founder

Dr. Winer is Professor of Mechanical Engineering and serves as Associate Director of the Virtual Reality Applications Center at ISU. Dr. Winer's research focuses on conceptual design of complex systems, virtual reality and visualization as aids in decision making, medical image visualization, segmentation and surgical planning. From 1994-2001, Dr. Winer was a founding partner of After Five Technologies originally headquartered in Buffalo, NY. After Five focused on e-commerce systems at the beginning of the commercial Internet boom in the late 1990s. His second company, Visual Design Systems, LLC provided visualization software and services from 2000-2004 to improve the design processes for engineered products.

Thom Lobe, MD, JD, MBA, FACS
Chief Medical Officer
BodyViz Founder

Dr. Lobe is a world-renowned Pediatric surgeon and specialist in Anti-Aging Medicine and Stem Cell Therapy. He is based in Chicago, IL where he works at Advocate Children's Hospital. Dr. Lobe's innovative ideas on using Medical Diagnostic imaging as a guide to surgical approaches provided the impetus to develop BodyViz. Dr. Lobe is a pioneer and expert in minimally-invasive surgery, anti-aging medicine and the use of stem cells to treat a variety of medical conditions. Dr. Lobe received his MD at the University of Maryland and did his residency at Ohio State University. Dr. Lobe has written more than 200 books, book chapters and peer-reviewed articles. He has lectured worldwide and has received lifetime achievement awards on three continents for his pioneering work.