

## **CURRICULUM VITAE**

***Name:*** Dennis Neil Aron, DVM, Dipl ACVS

***Title:*** Fido's Surgeon

***Phone:*** (760) 975-1020

***College Record:*** Youngstown State University, 1968-1971  
Ohio State University, DVM, 1971-1975

***States Licensed:*** Ohio, California, New Jersey, Nevada

***Specialty Boards:*** Diplomate, American College of Veterinary Surgeons - 1983

**POSTGRADUATE TRAINING****Intern**

Oradell Animal Hospital  
Oradell, NJ  
1975-1976

**Resident in Surgery**

Department of Clinical Sciences  
College of Veterinary Medicine  
Cornell University  
Ithaca, NY  
1976-1978

**ASIF Course**

Internal Fixation of Fractures and Nonunions  
The Ohio State University  
1977

**Visiting Resident in Surgery**

Harborview Medical Center  
Seattle, WA  
February 1978-May 1978

**EXPERIENCE****Assistant Professor**

Department of Clinical Sciences  
College of Veterinary Medicine  
Cornell University  
Ithaca, NY  
1978-1979

**Staff Surgeon**

Sacramento Animal Medical Group, Inc.  
Carmichael, CA  
1979-1980

**Assistant Professor**

Department of Small Animal Medicine  
University of Georgia  
Athens, Georgia  
1980-1987

**Associate Professor**

Department of Small Animal Medicine  
College of Veterinary Medicine  
University of Georgia  
Athens, Georgia  
1987-1995

**Professor**

Department of Small Animal Medicine  
College of Veterinary Medicine  
University of Georgia  
Athens, Georgia  
1995-2006 (retired)

**Joint Appointment**

Department of Anatomy and Radiology  
College of Veterinary Medicine  
University of Georgia  
Athens, Georgia  
1989-2006

**Graduate Faculty**

1989-2006

**University of Georgia Faculty of Engineering**

2002-2006

**Staff Surgeon**

Veterinary Surgical Specialists  
San Diego, CA  
2006-2008

**COMMITTEES AND DUTIES: Service on Committees Within the Department, College, or University; University of Georgia**

Admissions. 1981-1982  
 Laboratory Animal and Research, 1982-1983  
 Honors and Awards, Chairman, 1983-1984  
 Honors and Awards, 1984-1985  
 Education Resources and Computer, 1988-1991  
 Director, Small Animal Surgery Residents, 1986-1992  
 Research, 1988-1992  
 Manuscript Review Board, 1982-2006  
 Faculty Advisor to the Student Chapter of the AAHA, 1982-1997  
 Supervisor, Research Technicians, Dept of Small Animal Medicine, 1985-1998  
 Electron Microscopy & Laboratory Advisory, 1989-1997  
 Graduate Affairs, 1991-1998  
 Coordinator: Advanced Small Animal Junior Surgery, 1994-2006  
 Ad Hoc Committee: Guidelines for Distribution of Income, 1998-1999  
 Peer Evaluation Committee, 1998-2001  
 Go-Live Web Education, 1999-2001  
 Retreat Discussion: Department Head Interview, Chairman, 1999  
 ICU/Emergency Committee, Chairman 1999-2002  
 Neurology Search Committee, 2000-2002  
 Manuscript Reviews in College, 2000-2002  
 Chairman, Service Evaluation Committee, 2001-2002  
 Chairman, Intern/Resident Program Committee, 2001-2002  
 Faculty Retention Committee, 2002-2006  
 Faculty of Engineering, 2002-2006  
 Neurology Search Committee, 2004-2006

**COMMITTEES AND DUTIES: National**

Committee on Trauma. Veterinary Emergency Critical Care Society, 1985-1992;  
 Chairman, 1985  
 Editorial Review Board for Veterinary Surgery, 1985-1988  
 Credentials Committee for American College Veterinary Surgeons, 1986-1990  
 Editorial Review Board for Compendium on Continuing Education for the Practicing  
 Veterinarian, 1987-present  
 Publications Committee for Journal of Veterinary Emergency and Critical Care, 1988-  
 1990  
 Program Chairman, Veterinary Emergency and Critical Care Society, Annual Meeting,  
 Washington, DC, 1988

Invited Reviewer for Journal of American Veterinary Medical Association and American Journal of Veterinary Research, 1989-2007

Reviewer for Veterinary Medicine, periodic

Co-Coordinator, External Skeletal Fixation Educator and Researcher Group, 1990-present

Assistant Chairman, External Skeletal Fixation Laboratory 18th Veterinary Surgical Forum, Chicago, Illinois, October 29, 1990

Chairman, External Skeletal Fixation Laboratory, 19th Veterinary Surgical Forum, San Francisco, California, October 15, 1991

Chairman, External Fixation Laboratory for the 23rd Veterinary Surgical Forum, 1995

Chairman, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> Complete Courses in External Skeletal Fixation. Athens, GA, 1995-1997

Reviewer for American Association for Laboratory Animal Science, 1996

Orthopedic/Neurosurgery Consultant, Veterinary Information Network, 1994-1999

Orthopedic Case of the Month, Veterinary Information Network, 1997-1999

## **INSTRUCTION**

### **Undergraduate Curriculum**

- Small Animal Orthopedics and Neurosurgery – Primary and Secondary (average 30 weeks per year)
- General Surgery Practicum - 1997; 65 hours contact time
- Small Animal Basic Surgery Course
  - Coordinator – 1983, 1987, 1991, 1995, 1999; average 2 hours lecture/week, 20 hours laboratory/week for five weeks.
  - Instructor – average 8-20 hours per year, 1980-1999, 2003.
  - Coordinator – FHO Laboratory, 2001; 8 hours preparation, 20 contact hours laboratory, 2 contact hours lecture.
- Advanced Surgery Course
  - Coordinator – every year since inception in 1994 to present; 1 hour orientation, 1-3 hours pre session, 15-20 hours laboratory, 1-3 hours post session, 2-10 hours organization.
- Small and Large Animal Orthopedics Lecture Series (average 10-12 hours contact since 1980)
- ENGR 4350/6350
  - Lecture on the working interaction of the engineer and orthopedic surgeon, 1 hour per year 1992-1999

### **Graduate Curriculum**

SAMS 6990: Veterinary Biomechanics

Surgery Resident “Rounds”: Discussion of surgical cases (1 hour, several times a year (varies with year).

Intern/Resident Seminars, 1 presentation per year, 1980-1991, 1994, 1996, 1998, 2000-2004.

#### Thesis Directed

Mary Jean Gorse – University of Georgia, College of Veterinary Medicine, 1986-1989. Evaluation of N - Butyl Cyanoacrylate for the Fixation of Osteochondral Fractures

Willard G. Keller – University of Georgia, College of Veterinary Medicine, 1987-1990 (Incomplete). The Effect of Trans-Stifle External Skeletal Fixation and Hyaluronic Acid Therapy on Articular Cartilage in the Dog

Gilbert T. Robello – University of Georgia, College of Veterinary Medicine, 1988-1991. Polypropylene Mesh as a Medial Collateral Ligament Replacement in the Dog

Paula West – University of Georgia, College of Veterinary Medicine, 1989-1992 (Incomplete). A Histomorphometric and Microangiographic Analysis of Bone Healing in the Pigeon

Curtis W. Dewey – University of Georgia, College of Veterinary Medicine, 1990-1993. Static Strength Evaluation of Two New External Skeletal Fixation Arrangements for Femoral and Humeral Fractures

(Co-Directed) HE Dale: Bone-FixES - An Expert System for External Skeletal Fixation. Masters Defense, Artificial Intelligence Center, Department of Computer Science, University of Georgia, defended successfully December 7, 2000.

(Co-Directed) Ning Suo: Machine Learning Techniques for the Evaluation of External Skeletal Fixation Structures. Masters Defense, Artificial Intelligence Center, Department of Computer Science, University of Georgia, defended successfully August 2003.

(Co-Directed) Eric Stiles: GUI and Machine Learning Techniques for External Skeletal Fixator Educational Tool. Masters Project, Artificial Intelligence Center, Department of Computer Science, University of Georgia, defended successfully April 2005.

#### Research Directed Not Involving Thesis

Ulrich Rytz – University of Georgia, College of Veterinary Medicine, 1993-1995. Mechanical Evaluation of Soft Cast (Scotchcast, 3M) and Conventional Rigid and Semirigid Coaptation Methods

Alan Cross – University of Georgia, College of Veterinary Medicine, 1994-1997. Validation of a Finite Element Model of the Kirschner-Ehmer External Skeletal Fixation System.

Chris McCord – University of Georgia, College of Biological Engineering, January 1997-March 1997. Finite Element Analysis of External Skeletal Fixation (Senior Student Project)

Jon Cox - University of Georgia, College of Biological Engineering – April 1997-May 1997. Finite Element Analysis of External Skeletal Fixation (Senior Student Project)

Susanne Lauer – University of Georgia, College of Veterinary Medicine, 1996-1999. Numerous Projects of Finite Element Analysis of External Skeletal Fixation

Aric Applewhite – University of Georgia College of Veterinary Medicine, 1998 – 2000. Finite Element Analysis of External Skeletal Fixation

Heidi Radke – University of Georgia College of Veterinary Medicine. Finite Element Analysis of External Skeletal Fixation.

Arathi Vinayak – University of Georgia College of Veterinary Medicine. Finite Element Analysis of External Skeletal Fixation.

Marc Schenkel – University of Georgia College of Veterinary Medicine. Finite Element Analysis of External Skeletal Fixation & Machine Learning Techniques of the Evaluation of External Skeletal Fixation Structures.

Graduate Committee Member for Five MS Candidates -- Department of Anatomy and Radiology, College of Veterinary Medicine, University of Georgia

Mary Jean Gorse, 1986-1989

Willard G. Keller, 1987-1990

Gilbert T. Robello, 1988-1991

Paula West, 1989-1992, Major Professor

Curtis W. Dewey, 1990-1993, Major Professor

Graduate Committee Member for Three MS Candidates - Artificial Intelligence Center, Department of Computer Science, University of Georgia

HE Dale, 1998-2000

Ning Suo, 2002-2003

Eric Stiles, 2003-2005

Resident Advisor

Randy Basinger, 1985-1987

Mary Jean Gorse, 1986-1989

Willard G. Keller, 1987-1990

Gilbert T. Robello, 1988-1991

Curtis W. Dewey, 1990-1993

Ulrich Rytz, 1994-1995

## **Course Innovations**

Small Animal Orthopedics/Neurosurgery 1980-2006.

Made modifications of teaching goals and methods due to research with OISD and Ron Simpson. Shifted emphasis from the sole focus of the singular subject of orthopedics to a more “holistic” approach during the course.

The teaching of orthopedics now encompasses three areas: 1. Role of the Orthopedic Doctor; 2. Organization / Prioritization and the “Service” Concept; and 3. How to Continue to Learn Orthopedics After Graduation. This effort is a combination of planned experiences during the orthopedic block and culminates with a Laboratory at the end of the block (Bone Laboratory 1980-2002; PT Laboratory & Joint Surgery, 2002-2006).

This course emphasizes problem solving and active thinking. This can be difficult for many students as orthopedics is a discipline that can lend itself to a “cook-book” or technical manner of implementation. However, when orthopedics is implemented in this manner without depth of understanding and independent thought, results are inevitably poor and patient morbidity is frequently unacceptable.

Near the end of the orthopedic rotation the students had a simulated orthopedic experience, “bone laboratory” (1980-2002), where they were asked to solve fracture orthopedic problems without any help from experienced surgeons. After the laboratory the students radiographed their fixations. A few days later the fixations were critiqued and discussed during “Bone Laboratory Rounds”. The students learned the value and inherent difficulties with the problem solving approach to management of the orthopedic case. Most importantly, they learned to respect orthopedics and discover they must become a life long student in order to become life long learners and hone their skills with orthopedics and clinical medicine in general. “Bone laboratory” had been well received by the students. They all seemed to learn that the “real world” of orthopedic problem solving is: “...a lot harder than it looks when you (the “expert”) does it.” This lesson resulted in young practitioners who now prepared themselves better mentally before attempting orthopedic procedures on “real client animals” when they get into clinical practice.

SAMS 5370 (advanced surgery course)

Development of course objectives.

Require “real world” planning of case management through use of realistic resources available in practice.

Instituted evaluation methods per OISD input.

## **Meetings Attended**

AAHA case-problem based learning initiative, March 1993

### Other

Resident Journal Club/MM Rounds: 1 hour/week/year.

Intern Rounds: 2-4 separate formal presentations/year.

### **SCHOLARLY PRESENTATIONS: Research Abstracts, Presentations, and Poster Sessions Presented at Meetings of Learned Societies**

Aron DN and Purinton PT: Shearing Injuries of the Canine Tarsus -- Experimental Study. Vet Orthop Soc 9th Annual Winter Conference, Park City, Utah, March 5, 1982.

Aron DN and Purinton PT: Prosthetic Collateral Ligament Replacement of the Talocrural Joint - Case Presentations. Vet Orthop Soc 11th Annual Winter Conference, Steamboat Springs, Colorado, February 28, 1984.

Aron DN and Toombs JP: Updated Principles of External Skeletal Fixation. Vet Orthop Soc 11th Annual Winter Conference, Steamboat Springs, Colorado, March 1, 1984.

Aron DN and Toombs JP: Primary Reconstruction of Severe Fractures Using External Skeletal Fixation: Clinical Experience and Insight. American College of Veterinary Surgeons 20th Annual Meeting, San Diego, California, February 8, 1985.

Basinger RR and \*Aron DN: Compartment Compliance: An Experimental Study in the Dog. Vet Orthop Soc 13th Annual Winter Conference, Steamboat Springs, Colorado, March 7, 1986.

Aron DN and Toombs JP: Primary Treatment of Severe Fractures by External Skeletal Fixation: Threaded Pins Compared with Smooth Pins. Veterinary Emergency and Critical Care Society Annual Meeting, New Orleans, Louisiana, March 24, 1986.

Basinger RR, \*Aron DN, Crowe DT and Purinton PT: Osteofascial Compartment Syndrome in the Dog. 2nd Annual Scientific Session of the Academy of Surgical Research, Clemson, South Carolina, November 1, 1986.

Palmer RH, \*Aron DN, and Purinton PT: Intramedullary Pin Fixation of Femoral Fractures: An Anatomic Study of Retrograde and Normograde Techniques. Vet Orthop Soc 14th Annual Winter Conference, Sun Valley, Idaho, February 1987.

Palmer RH, \*Aron DN, and Chambers JN: Olecranon Osteotomies: A Combination Lag Screw Tension Band Fixation Technique. Vet Orthop Soc 15th Annual Winter Conference, Breckenridge, Colorado, February 26, 1988.

Aron DN and Rowland GN: Development and Reversal of Alterations in Ankle Cartilage Following Splintage: Update on Research. Cherry Blossom Sports Medicine Symposium, Macon, Georgia, March 25, 1988.

Rowland GN and Aron DN: Development of a Model of Angulation Defects in the Avian. American Veterinary Medical Association 125th Annual Meeting, Portland, Oregon, July 1988.

Toombs JP, Aron DN, Basinger RR, and Ewing P: Angled Connecting Bars for Transarticular Application of Kirschner-Ehmer External Fixation Splints. American College of Veterinary Surgeons 24th Annual Meeting, Reno, Nevada, February 9, 1989.

Gorse MJ, \*Aron DN, Rowland GN, and Purinton PT: Evaluation of n-Butyl Cyanoacrylate for Fixation of Osteochondral Fracture. Vet Orthop Soc 16th Annual Winter Conference, Park City, Utah, February 21, 1989.

Keller W, \*Aron DN, and Crowe DT: Use of Tissue Expanders for Treating Skin Defects on the Distal Limbs of Dogs. Southeastern Veterinary Surgeon's Conference, Hiawassee, Georgia, April 15, 1989.

Gorse MJ, Early T, and \*Aron DN: Tarsocrural Arthrodesis: Long Term Functional Results. Southeastern Veterinary Surgeon's Conference, Hiawassee, Georgia, April 15, 1989.

Rowland GN, Aron DN, and Brown J: Characterization of a Valgus Defect of the Intertarsal Joint in the Avian. American Veterinary Medical Association 126th Annual Meeting, Orlando, Florida, July 19, 1989.

Aron DN, Foutz TL, Keller WG, Brown J: Experimental and Clinical Experience with an IM Pin/External Skeletal Fixator Tie-In Configuration for Fractures of the Humerus and Femur. Veterinary Orthopedic Society 17th Annual Conference, Jackson Hole, Wyoming, March 6, 1990.

Keller WG, \*Aron DN, Rowland GN, Brown J: A Morphologic Assessment of the Influence of Hyaluronic Acid on the Articular Cartilage of Canine Stifle Joints Immobilized with Transarticular External Skeletal Fixation. Orthopedic Society 17th Annual Conference, Jackson Hole, Wyoming, March 6, 1990.

Gorse MJ, Purinton PT, Penwick RC, Aron DN, Roberts RE: Talocalcaneal Luxation: An Anatomic and Clinical Study. Orthopedic Society 17th Annual Conference, Jackson Hole, Wyoming, March 9, 1990.

Keller WG, \*Aron DN, Rowland GN, and Brown J: Transarticular External Skeletal Fixation Induced Articular Cartilage Disturbances and the Potential for Management Using Hyaluronic Acid. Southeastern Veterinary Surgeons Conference, Lake Lanier, Georgia, March 17, 1990.

Robello GT, \*Aron DN, Rowland GN, and Foutz TL: Preliminary Studies on Evaluation of a Prosthetic Collateral Ligament. Southeastern Veterinary Surgeons Conference, Lake Lanier, Georgia, March 17, 1990.

Aron DN, Foutz TL: *In Vitro* Mechanical Performance of Seven External Skeletal Fixation Pins. 19th Annual Meeting Veterinary Orthopedic Society, Keystone, CO. March 1, 1992.

Aron DN, Foutz TL: *In Vitro* Mechanical Performance of Seven External Skeletal Fixation Pins. 1st Complete Course in External Fixation, Austin, Texas, October 6, 1992.

Dewey CW, \*Aron DN, Foutz TL, Marks MA: Static Strength Evaluation of Two New External Skeletal Fixation Arrangements for Femoral Fractures. 27th Annual ACVS Scientific Meeting, Miami, Florida, November 3, 1992.

Dewey CW, Downs MO, Aron DN, Mahaffey EA: Acute Traumatic Intracranial Hemorrhage in Dogs And Cats: A Retrospective Evaluation of 23 Cases. 28th Annual ACVS Scientific Meeting, San Francisco, California, October 26, 1993.

Aron DN, Rowland GN, Foutz TL: Studies & Experiences With Joint Immobilization. Southeastern Veterinary Surgeons Conference, Lake Lanier, Georgia, July 23, 1994.

Rytz U, \*Aron DN, Foutz TL, Thompson SA: Mechanical Evaluation of Soft Cast (Scotchcast, 3M) and Conventional Rigid and Semirigid Coaptation Methods. 22nd Annual Meeting Veterinary Orthopedic Society, Vancouver, BC, March 1995.

Aron DN, Rytz U: Research Studies with Progressive Staged Mobilization of the Dog. 3M Executives and Scientists, 3M Center, St. Paul, MN, February 1996.

Hay CW, \*Aron DN, Roberts R, Stallings J, Brown J: Evaluation of Positive Contrast Arthrography in Canine Cranial Cruciate Ligament Disease. 31st Annual Scientific Meeting American College of Veterinary Surgeons Veterinary Symposium, San Francisco, CA, November 1996.

Aron DN: The Problem of Bridging Classroom to Clinics. The Third Annual Lilly Conference on College & University Teaching, Georgia Center for Continuing Education, Athens, GA. May 24, 1997.

Cross AR, \*Aron DN, Budsberg SC, Foutz TL, Pearman BT, Evans MD: Validation of a Finite Element Model of the Kirschner Ehmer External Fixation System. Southeastern Veterinary Surgeons Conference, Asheville, NC, May 31, 1997.

Lauer SK, \*Aron DN: The Effect of Articulations in an 8-Pin type Ib External Skeletal Fixator, Finite Element Method Studies. Southeastern Veterinary Surgeons Conference, Asheville, NC, May 31, 1997.

Lauer SK, \*Aron DN: Using the Finite Element Method to Study the Biomechanics of the External Skeletal Fixation System of Fracture Management. 6th Annual Complete Course in External Skeletal Fixation, Athens, GA, September 26, 1997.

\*\*Cross AR, \*Aron DN, Budsberg SC, Foutz TL, Pearman BT, Evans MD: Validation of a Finite Element Model of the Kirschner Ehmer External Fixation System. 32<sup>nd</sup> Annual Scientific Meeting, American College of Veterinary Surgeons, Orlando, FL, October 17, 1997.

Lauer SK, \*Aron DN, Evans MD: The Finite Element Method as an Aid to Clinical Orthopedics. Southeastern Veterinary Surgeons Conference, Asheville, NC, June 6, 1998

Lauer SK, \*Aron DN, Evans MD: Finite Element Method as an Aid to Clinical Orthopedics: Articulations and Diagonals for Type Ib External Skeletal Fixators. 7<sup>th</sup> Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, September 26, 1998.

Lauer SK, \*Aron DN, Evans MD: Finite Element Method as an Aid to Clinical Orthopedics: Modification of the KE Device with Carbon Fiber Rods. 7<sup>th</sup> Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, September 26, 1998.

Lauer SK, \*Aron DN, Evans MD: Finite Element Method Evaluation-Articulations and Diagonal Frames in an 8-Pin Type Ib External Skeletal Fixator. 33<sup>rd</sup> Annual Scientific Meeting, American College of Veterinary Surgeons, Orlando, FL, October 9, 1998.

Purinton PT, Grynkewich LC, Aron DN, Simpson RD: A Study of the Learning Styles of Entering Veterinary Students. Annual Meeting of the American Association of Veterinary Anatomists, Blacksburg, VA, July 24, 1998.

Lauer SK, \*Aron DN, Evans MD: Optimization of Type II and III External Skeletal Fixators for Comminuted Distal Long Bone Fractures – Finite Element Method Evaluation (poster). 34<sup>th</sup> Annual Scientific Meeting, American College of Veterinary Surgeons, San Francisco, CA, September 30 – October 3, 1999.

Lauer SK, \*Aron DN, Evans MD: Destabilization in External Skeletal Fixation – Finite Element Method Evaluation (poster). 34<sup>th</sup> Annual Scientific Meeting, American College of Veterinary Surgeons, San Francisco, CA, September 30 – October 3, 1999.

Potter WD, Aron DN, Dale HE, Greene G, Wang T: Bone-FixES: An External Skeletal Fixation Expert System. International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences. Las Vegas, Nevada, June 2000.

Aron DN, Lauer SK (presenter), Evans MD: Mechanical Comparison of the IMEX™ SK to the IMEX™ KE External Skeletal Fixation Device – Evaluation with the Finite Element Method. 29<sup>th</sup> Annual Conference of the Veterinary Orthopedic Society, February 2002.

Lauer SK, \*Aron DN, Evans MD: Destabilization in External Skeletal Fixation – Finite Element Method Evaluation. 29<sup>th</sup> Annual Conference of the Veterinary Orthopedic Society, February 2002.

Suo N, Rasheed K, Potter WD, \*Aron DN: Machine Learning Techniques for the Evaluation of External Skeletal Fixation Structures. International Conference on Machine Learning (ICML), Washington DC, August 24-27, 2003. \*originated project & directed first author  
\*\*scientific award

## **PROFESSIONAL PRESENTATIONS: Invited Lectures**

### *International*

Primary Survey and Care of Musculoskeletal Trauma Patients. 1st International Veterinary Emergency and Critical Care Symposium, San Antonio, Texas, September 11, 1988.

Management of Open Musculoskeletal Injuries. 1st International Veterinary Emergency and Critical Care Symposium, San Antonio, Texas, September 11, 1988.

Principles of External Fixators. 1st International Veterinary Emergency and Critical Care Symposium, San Antonio, Texas, September 11, 1988.

Management of Hip and Elbow Luxations. 1st International Veterinary Emergency and Critical Care Symposium, San Antonio, Texas, September 11, 1988.

Current Perspectives in the Critical Management of Musculoskeletal Injuries and Wounds in the Emergency Patient. 3rd Annual Veterinary Surgical Forum-Europe, Munich, West Germany, May 26, 1989.

New Perspectives in the Use of External Skeletal Fixation in Management of the Multiple Trauma Patient. 3rd Annual Veterinary Surgical Forum-Europe, Munich, West Germany, May 27, 1989.

Current Perspectives in the Prevention and Management of Serious Bacterial Infections in the Critically Ill Patient. 3rd Annual Veterinary Surgical Forum-Europe, Munich, West Germany, May 27, 1989.

External Skeletal Fixation. Universitat Bern, Tierspital Bern, Bern, Switzerland, May 29, 1989.

Special Trauma Workshop: Fracture Management, Wounds, Sepsis Control. 2nd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 16, 1990.

Principles and Practical Techniques for Fracture Management. 3rd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 21, 1992.

Case Examples of Fracture Management. 3rd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 21, 1992.

Trouble Shooting Fracture Complications: Discussion, Q & A. 3rd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 21, 1992.

External Skeletal Fixation Laboratory, Chairman. 3rd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 21, 1992.

Wound Management: Materials & Techniques Laboratory, Chairman. 3rd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 21, 1992.

Practical Techniques for Fractures (Japanese Translations). 61st Annual Meeting of the American Animal Hospital Association, Boston, Massachusetts, March 9, 1994.

External Skeletal Fixation System: IM Pins, Wire, & Fixator Laboratory (Japanese Session), Chairman. 61st Annual Meeting of the American Animal Hospital Association, Boston, Massachusetts, March 9, 1994.

The Kirschner External Fixator: Biomechanics, Techniques of Application, Results, and Complications. 4th Annual Conference on External Fixation, Nantes, France, September 22, 1994.

The Acrylic Bar External Fixator: Biomechanics, Techniques of Application, Results, and Complications. 4th Annual Conference on External Fixation, Nantes, France, September 22, 1994.

Management of Fractures of the Mandible with External Fixation. 4th Annual Conference on External Fixation, Nantes, France, September 23, 1994.

(Six hours lectures) Annual International Veterinary Congress 'de Voorjaarsdagen', Amsterdam, The Netherlands, April 27-28, 1996.

(Three hour laboratory) Annual International Veterinary Congress 'de Voorjaarsdagen', Amsterdam, The Netherlands, April 28, 1996.

(Eighty-two hours lectures) Orthopedics Seminar, Sapporo, Fukuoka, Osaka, Tokyo, Japan, June 12 – July 3, 1996.

(Sixteen hours lectures) External Skeletal Fixation, Post Graduate Foundation in Veterinary Science, Sydney, Australia, August 19-20, 1996.

(Six hours laboratory) External Skeletal Fixation, Post Graduate Foundation in Veterinary Science, Sydney, Australia, August 21, 1996.

(Twelve hours lectures) Updated Use of External Skeletal Fixation, Universitas Bernensis, Fortbildungskurs Kleintiere, Zentralstelle Weiter – und Fortbildung GST, Bern, Switzerland, June 24-25, 1999.

(Four hours laboratory) Updated Use of External Skeletal Fixation, Universitas Bernensis, Fortbildungskurs Kleintiere, Zentralstelle Weiter – und Fortbildung GST, Bern, Switzerland, June 24-25, 1999.

(Eight hours lectures) Various Orthopedic Topics, World Veterinary Medical Association Congress, Amsterdam, The Netherlands, April 26-30, 2000.

(Seven hours laboratories) External Skeletal Fixation, World Veterinary Medical Association Congress, Amsterdam, The Netherlands, April 26-30, 2000.

(Six hours lectures) The Complete Course in External Skeletal Fixation, Lifelearn Inc. & Ontario Veterinary College, University of Guelph, Guelph, Ontario, October 21-22, 2000.

(Six hours laboratories) The Complete Course in External Skeletal Fixation, Lifelearn Inc. & Ontario Veterinary College, University of Guelph, Guelph, Ontario, October 21-22, 2000.

(Twenty hours lectures & laboratories) Updated Use of External Skeletal Fixation, Sponsored by B. Braun Medical Produkte & Universität Bern, Switzerland, May 13-14, 2004.

### *National*

Prosthetic Collateral Ligament Replacement of the Tarsocrural Joint: Principles and Uses of External Pin Fixation. 12th Veterinary Surgical Forum, Chicago, Illinois, October 24, 1984.

Principles and Techniques of Closed Reduction of Hip and Elbow Luxations. 12th Veterinary Surgical Forum, Chicago, Illinois, October 25, 1984.

Degenerative Joint Disease: Causes and Management. 12th Veterinary Surgical Forum, Chicago, Illinois, October 26, 1984.

Primary Survey and Care of the Musculoskeletal System in the Trauma Patient. Veterinary Emergency and Critical Care Society Annual Meeting, New Orleans, Louisiana, March 22, 1986.

Treatment and Re-evaluation of the Trauma Patient with Musculoskeletal Injury. Veterinary Emergency and Critical Care Society Annual Meeting, New Orleans, Louisiana, March 24, 1986.

Wounds and the Musculoskeletal Injury. American Animal Hospital Association 55th Annual Meeting - Specialty Group, Veterinary Emergency and Critical Care Society, Washington, DC, April 16, 1988.

Practical Fracture Management-Pins, Wires, etc. Florida Veterinary Medical Association 1989 Convention, Orlando, Florida. September 15, 1989.

Management of Selected Joint Problems-Cruciate, Patella, Hip/Elbow Luxation, DJD, Shear Injuries. Florida Veterinary Medical Association 1989 Convention, Orlando, Florida. September 15-16, 1989.

Current Perspective in the Critical Management of Open Musculoskeletal Injuries and Wounds. Florida Veterinary Medical Association 1989 Convention, Orlando, Florida. September 16, 1989.

Wound Management for the Veterinary Technician. Florida Veterinary Medical Association 1989 Convention, Orlando, Florida. September 17, 1989.

External Skeletal Fixation Laboratory. 17th Veterinary Surgical Forum, Chicago, Illinois, October 23, 1989.

The Oblique Fracture: Special Considerations for Management. Gaines Cycle Symposium, 56th Annual Conference of the New England Veterinary Medical Association, Hyannis, Massachusetts, September 10, 1990.

External Skeletal Fixation of the Femur and Humerus. 18th Veterinary Surgical Forum, Chicago, Illinois, October 29, 1990.

External Skeletal Fixation Laboratory, Assistant Chairman. 18th Veterinary Surgical Forum, Chicago, Illinois, October 29, 1990.

Basic Biomechanics of External Fixator Design. 1991 Eastern States Veterinary Conference, Orlando, Florida, January 12, 1991.

Fundamentals of Frame Construction, Pin Insertion, and Postoperative Care. 1991 Eastern States Veterinary Conference, Orlando, Florida, January 12, 1991.

Case Presentations on Stabilization of Humeral and Femoral Fractures. 1991 Eastern States Veterinary Conference, Orlando, Florida, January 12, 1991.

External Skeletal Fixation Laboratory. Laboratory Coordinator and Presenter. 1991 Eastern States Veterinary Conference, Orlando, Florida, January 12, 1991.

Musculoskeletal Trauma. 63rd Annual Western Veterinary Conference, Las Vegas, Nevada, February 19, 1991.

External Skeletal Fixation; Prevention of Bacterial Infections. 63rd Annual Western Veterinary Conference, Las Vegas, Nevada, February 20, 1991.

Management of Musculoskeletal Injuries. 20th Annual Technicians' Seminar, 63rd Annual Western Veterinary Conference, Las Vegas, Nevada, February 21, 1991.

Soft Tissue Considerations and Postoperative Management. 19th Veterinary Surgical Forum, San Francisco, California, October 14, 1991.

External Skeletal Fixation of the Femur and Humerus. 19th Veterinary Surgical Forum, San Francisco, California, October 14, 1991.

External Skeletal Fixation Laboratory, Chairman. 19th Veterinary Surgical Forum, San Francisco, California, October 15, 1991.

External Skeletal Fixation of the Femur and Humerus. 1st Complete Course in External Fixation, Austin, Texas, October 4, 1992.

Clinical Application of ESF for Treatment of Femoral Fractures. 1st Complete Course in External Fixation, Austin, Texas, October 5, 1992.

Clinical Application of ESF for Treatment of Humeral Fractures. 1st Complete Course in External Fixation, Austin, Texas, October 5, 1992.

Postoperative Management of Fixators. 1st Complete Course in External Fixation, Austin, Texas, October 6, 1992.

Laboratories I & II Instrumentation: External Skeletal Fixation, Intramedullary Pins, Wire, Co-Coordinator. 1st Complete Course in External Fixation, Austin, Texas, October 5, 1992.

Laboratory III Application of ESF: Decision Making. 1st Complete Course in External Fixation, Austin, Texas, October 6, 1992.

Application of ESF Instrumentation to the Femur and Humerus. 2nd Annual Complete Course in External Fixation, Austin, Texas, October 3, 1993.

Clinical Application of ESF for Treatment of Femoral and Humeral Fractures. 2nd Annual Complete Course in External Fixation, Austin, Texas, October 4, 1993.

Laboratories I & II Instrumentation: External Skeletal Fixation, Intramedullary Pins, Wire, Co-Coordinator. 2nd Annual Complete Course in External Fixation, Austin, Texas, October 4, 1993.

Laboratory III Application of ESF: Decision Making. 2nd Annual Complete Course in External Fixation, Austin, Texas, October 4, 1993.

Treatment of Femoral and Humeral Fractures with ESF Alone or in Combination with Pins and Wire. 21st Veterinary Surgical Forum, San Francisco, California, October 24, 1993.

IM Pins, Wire, & Fixator Laboratory, Coordinator. 21st Veterinary Surgical Forum, San Francisco, California, October 25, 1993.

Practical Techniques for Fractures. 61st Annual Meeting of the American Animal Hospital Association, Boston, Massachusetts, March 7, 1994.

Fracture Complications. 61st Annual Meeting of the American Animal Hospital Association, Boston, Massachusetts, March 7, 1994.

External Skeletal Fixation System: IM Pins, Wire, & Fixator Laboratory, Chairman. 61st Annual Meeting of the American Animal Hospital Association, Boston, Massachusetts, March 8, 1994.

Update on Cranial Cruciate Ligament Disease. Veterinary Information Network, Online Presentation, August 28, 1994.

Laboratory 1: Basic External Skeletal Fixation Application Techniques & Biomechanics. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 2, 1994.

Surgical Techniques of External Skeletal Fixator Application on the Femur. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 3, 1994.

Preoperative, Intraoperative, and Postoperative Decision Making of the Humerus. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 3, 1994.

Laboratory 2: Application of External Skeletal Fixation to the Radius and Tibia. Demonstration of APEF System. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 3, 1994.

Laboratory 3A: Application of External Skeletal Fixation to the Femur, Coordinator. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 3, 1994.

Laboratory 3B: Application of External Skeletal Fixation to the Humerus, Coordinator. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 3, 1994.

Preoperative, Intraoperative, and Postoperative Decision Making of the Femur. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 4, 1994.

Laboratory 4: Clinical Case Simulation for Application of Decision making Principles. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 4, 1994.

Decision Making and Fracture Assessment Score for External Fixation. 22nd Veterinary Surgical Forum, Washington, D.C., October 18, 1994.

Management of Femoral and Humeral Fractures with External Fixation. 22nd Veterinary Surgical Forum, Washington, D.C., October 18, 1994.

Post-operative Management and Complications of External Fixation. 22nd Veterinary Surgical Forum, Washington, D.C., October 18, 1994.

External Fixation Laboratory 1 - Exercise 1, Coordinator. 22nd Veterinary Surgical Forum, Washington, D.C., October 19, 1994.

External Fixation Laboratory 2 - Exercise 2, Coordinator. 22nd Veterinary Surgical Forum, Washington, D.C., October 19, 1994.

Practical Techniques for Fractures. International Veterinary Seminars, Los Cabos, Mexico, January 22, 1995.

Fracture Complications. International Veterinary Seminars, Los Cabos, Mexico, January 22, 1995.

Update on Cranial Cruciate Ligament Disease. International Veterinary Seminars, Los Cabos, Mexico, January 23, 1995.

Emergency Treatment of Fractures and Wounds. International Veterinary Seminars, Los Cabos, Mexico, January 24, 1995.

Ununited Anconeal Process. International Veterinary Seminars, Los Cabos, Mexico, January 25, 1995.

Fragmented Coronoid Process. International Veterinary Seminars, Los Cabos, Mexico, January 25, 1995.

Osteochondrosis. International Veterinary Seminars, Los Cabos, Mexico, January 25, 1995.

(Two hours computer real-time interactive session) Use of Biologic Strategies and a Balanced Concept for Repair of Highly Comminuted Long Bone Fractures in Dogs and Cats. Veterinary Information Network, February 12, 1995.

(Six hours lectures) 4<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, October 2-4, 1995.

(Eight hours laboratories) 4<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, October 2-4, 1995.

(Six hours lectures) 5<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, October 5-7, 1996.

(Eight hours laboratories) 5<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, October 5-7, 1996.

(Two hours lectures) External Skeletal Fixation of the Femur and Humerus. 24<sup>th</sup> Annual Surgical Forum Chicago, IL, November 5, 1996.

(Seven hours lectures) 68<sup>th</sup> Annual Meeting 1996 Western Veterinary Conference, Las Vegas, NV, February 18-22, 1996.

(20 hours every 2 months) Orthopedic Case of the Month. Veterinary Information Network. 1997-1999.

(Six hours lectures) 6<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, September 26-28, 1997.

(Eight hours laboratories) 6<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, September 26-28, 1997.

Management of the Joint After Surgery. 25<sup>th</sup> Annual Surgical Forum Orlando, FL, October 18, 1997.

Achieving a Balanced Osteosynthesis with the ESF System. 25<sup>th</sup> Annual Surgical Forum, Orlando, FL October 18, 1997.

(Eight hours lectures) Montana Veterinary Medical Association 1998 Summer Meeting, Billings, MT, June 21, 1998.

(Two hours computer real-time interactive session) Fracture Management. Veterinary Information Network, August 18, 1998.

(Six hours lectures) 7<sup>th</sup> Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, September 25-27, 1998.

(Eight hours laboratories) 7<sup>th</sup> Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, September 25-27, 1998.

(Eight hours lectures) Central Florida Academy of Veterinary Medicine, Inc., Orlando, FL, November 14-15, 1998.

(Four hours lectures), Small Animal Cranial Cruciate Injury, Athens, GA February 27-28, 1999.

(Four hours laboratories) Small Animal Cranial Cruciate Injury, Athens, GA, February 27-28, 1999.

(Four hours lectures) Second Offering: Small Animal Cranial Cruciate Injury, Athens, GA, August 28-29, 1999.

(Four hours laboratories) Second Offering: Small Animal Cranial Cruciate Injury, Athens, GA, August 28-29, 1999.

Surgical Management of Traumatic Injuries Involving Tendons and Ligaments. 27th Annual Surgical forum, San Francisco, CA October 2, 1999.

Postoperative Management of Tendon/Ligament Injuries. 27th Annual Surgical Forum, San Francisco, CA, October 2, 1999.

(Eight hours lectures) Various Topics on Joint Surgery of the Dog and Cat. 1999 Oklahoma State University Fall Conference for Veterinarians, Stillwater, Oklahoma, October 21 – 22, 1999.

(Five hours lectures) 8th Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, October 30 – November 1, 1999.

(Eight hours laboratories) 8th Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, October 30 – November 1, 1999.

(Two hours computer real-time interactive session) Management of the Joint After Surgery. Veterinary Information Network, October 24, 1999.

(Six hours / Week Internet Web Site) Small Animal Cranial Cruciate Injury. Georgia Online Veterinary Interactive Education, University of Georgia, College of Veterinary Medicine, Athens, GA, November 1999.

(Eight hours lectures) Cruciate Ligament Disease and Postoperative Rehabilitation, Montana Veterinary Medical Association, Bozeman, MT, February 26 – 27, 2000.

(Four hour laboratory) Cruciate Ligament Disease and Postoperative Rehabilitation, Montana Veterinary Medical Association, Bozeman, MT, February 26 – 27, 2000.

(Eight hours lectures), Complete Course in Rehabilitation of the Dog and Cat, Athens, GA August 19, 2000.

(Five hours laboratories) Complete Course in Rehabilitation of the Dog and Cat, Athens, GA August 20, 2000.

Rehabilitation of the Dog with Cranial Cruciate Ligament Disease. 28th Annual Surgical forum, Arlington, VA, September 22, 2000.

(Five hours lectures) 9<sup>th</sup> Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, November 11-13, 2000.

(Eight hours laboratories) 9<sup>th</sup> Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, November 11-13, 2000.

(Multiple Internet Sessions) Complete Course in Rehabilitation of the Dog and Cat, Athens, GA 2000-2002 (project collaboration with Dr. Duncan Ferguson).

(Five hours lectures) Complete Course in Diagnosis & Management of Cranial Cruciate Injury in the Dog, Athens, GA, August 11 – 12, 2001.

(Four hours laboratory) Complete Course in Diagnosis & Management of Cranial Cruciate Injury in the Dog, Athens, GA, August 11 – 12, 2001.

(Eight hours lectures) Course in Small Animal External Skeletal Fixation, Dallas, TX, September 22-23, 2001.

(Eight hours laboratory) Course in Small Animal External Skeletal Fixation, Dallas, TX, September 22-23, 2001.

(Four hours lectures) 10<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, March 24 – 26, 2002.

(Eleven hours laboratory) 10<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, March 24 – 26, 2002.

(Five hours lectures) 11<sup>th</sup> Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, November 14-16, 2003.

(Ten hours laboratories) 11<sup>th</sup> Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, November 14-16, 2003.

(Four hours lectures) 12<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 10-12, 2004.

(7.5 hours laboratories) 12<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 10-12, 2004.

(Four hours lectures) 13<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 17-19, 2005.

(10 hours laboratories) 13<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 17-19, 2005.

Introduction to the external skeletal fixation system (ESF). 1 hour. Also published in Proceedings 122nd Annual Meeting of the New Jersey Veterinary Medical Association, Florham Park, NJ March 2006.

The fracture assessment score – an update. 1 hour. Also published in Proceedings 122nd Annual Meeting of the New Jersey Veterinary Medical Association, Florham Park, NJ March 2006.

Humerus/Femur & radius – ulna/tibia: ESF technique & case presentation. 2 hours. Also published in Proceedings 122nd Annual Meeting of the New Jersey Veterinary Medical Association, Florham Park, NJ March 2006.

Postoperative management of the ESF system & enhancing bone healing. 1 hour. Also published in Proceedings 122nd Annual Meeting of the New Jersey Veterinary Medical Association, Florham Park, NJ March 2006.

Cruciate ligament disease: etiology & pathophysiology. 1 hour. Also published in Proceedings 122nd Annual Meeting of the New Jersey Veterinary Medical Association, Florham Park, NJ March 2006.

Cruciate ligament disease: treatment. 2 hours. Also published in Proceedings 122nd Annual Meeting of the New Jersey Veterinary Medical Association, Florham Park, NJ March 2006.

Joint surgery: rehabilitation. 2 hours. Also published in Proceedings 122nd Annual Meeting of the New Jersey Veterinary Medical Association, Florham Park, NJ March 2006.

A basic level of fracture fixation with emphasis on the ESF system. 2 hours. Also published in Proceedings CVC East Veterinary Conference, Baltimore, MD April 2006.

An update on cruciate ligament disease. 2 hours. Also published in Proceedings CVC East Veterinary Conference, Baltimore, MD April 2006.

Postoperative rehabilitation of small-animal orthopedic patients. 2 hours. Also published in Proceedings CVC East Veterinary Conference, Baltimore, MD April 2006.

(Three hours lectures) 14<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 17-18, 2006.

(10 hours laboratories) 14<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 16-18, 2006.

(Three hours lectures) 15<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 22-23, 2007.

(10 hours laboratories) 15<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 21-23, 2007.

(Three hours lectures) 16<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 20-21, 2008.

(10 hours laboratories) 16<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 19-21, 2008.

### ***Regional***

Comparative Orthopedics. Harborview Medical Center, Seattle, Washington, April, 1978.

Small Animal Orthopedics I. Cornell University Annual Conference - January, 1979.

Small Animal Orthopedics II. Cornell University Annual Conference - January, 1979.

Soft Tissue Surgery I - The Management of Trauma. Cornell University Annual Conference - January, 1979.

Principles of Trauma Management in Small Animals. Sacramento Veterinary Medical Association, October 11, 1979.

Principles of Trauma Management in Veterinary Medicine. AAHA Region I Meeting, January 31, 1979.

Air Instrument Surgery and Wet Laboratory. Sacramento Valley Veterinary Medical Association, January 6, 1980.

Principles of External Skeletal Fixation. Short course, University of Georgia, College of Veterinary Medicine, Athens, Georgia, October, 1980.

Principles of External Skeletal Fixation. Macon Veterinary Group, Macon, Georgia, October 22, 1980.

A "New" Tendon Stitch. South Carolina Veterinary Medical Association, July, 1981.

Arthritis and Other Joint Diseases. Short Course Coordinator and Moderator. University of Georgia, College of Veterinary Medicine, Athens, Georgia, October 27-28, 1983.

Clinical Examination of the Arthritis Patient. Short course, University of Georgia, College of Veterinary Medicine, Athens, Georgia, October 27, 1983.

Degenerative Arthropathy. Short course, University of Georgia, College of Veterinary Medicine, Athens, Georgia, October 28, 1983.

Traumatic Arthropathy. Short course, University of Georgia, College of Veterinary Medicine, Athens, Georgia, October 28, 1983.

Open Fracture and Wound Management. Short course, Small Animal Surgical Update, University of Georgia, College of Veterinary Medicine, Athens, Georgia, November 10, 1983.

Selective Joint Surgery: A Wet Laboratory Exercise. Short course coordinator and presenter, University of Georgia, College of Veterinary Medicine, Athens, Georgia, February 10, 1984.

Selective Joint Surgery: A Wet Laboratory Exercise. Short course coordinator and presenter, University of Georgia, College of Veterinary Medicine, Athens, Georgia, March 9, 1984.

Stent and Prosthetic Replacement for Trauma to the Collateral Ligament Complex of the Hock: Experimental Study and Clinical Experience. Department of Surgical Sciences, University of Wisconsin-Madison, School of Veterinary Medicine, July 6, 1984.

External Skeletal Fixation - Case Presentations. Short Course, University of Georgia, College of Veterinary Medicine, Athens, Georgia, September 6, 1984.

New Techniques and Materials Practitioners May Want to Add to Their Armamentarium. Southeastern AAHA Regional Meeting, Atlanta, Georgia, October 11, 1984.

Orthopedics. University of Georgia Veterinary Seminar in Acapulco, Acapulco, Mexico, January 10-14, 1985.

Canine Surgery Workshop. Short course coordinator. University of Georgia, College of Veterinary Medicine, Athens, Georgia, November 22-23, 1985.

Use of Orthopedic Wire. Short course, University of Georgia, College of Veterinary Medicine, Athens, Georgia, November 22, 1985.

Fracture and Joint Surgery. University of Georgia, Veterinary Seminar in Cancun, Cancun, Mexico, January 26-February 2, 1986.

Primary Treatment of Severe Fractures by External Skeletal Fixation. Animal Medical Center, New York, New York, April 4, 1986.

Emergency Management Procedures Involving the Musculoskeletal System. Short course, University of Georgia, College of Veterinary Medicine, Athens, Georgia, February 27, 1988.

Basic Orthopedic Fracture Repair Techniques. Winter Conference of the South Carolina Association of Veterinarians, Columbia, South Carolina, January 7, 1989.

The Need for Biomechanics in Veterinary Clinical Practice. Department of Agricultural Engineering, University of Georgia, Athens, Georgia, February 1, 1989.

External Skeletal Fixation Workshop for Veterinary Practitioners. Short Course Coordinator. University of Georgia, College of Veterinary Medicine, Athens, Georgia, August 26-27, 1989.

(9 hours lectures and laboratory) External Skeletal Fixation Workshop for Veterinary Practitioners. University of Georgia, College of Veterinary Medicine, Athens, Georgia. August 26-27, 1989.

Emergency Management Procedures Involving the Musculoskeletal System. Life Saving and Emergency Procedures Workshop for practitioners, University of Georgia, College of Veterinary Medicine, Athens, Georgia. September 9, 1989.

Biomechanics of Fracture Repair. Weekly Seminar Series, Department of Anatomy and Radiology, University of Georgia, College of Veterinary Medicine, Athens, Georgia, November 30, 1989.

External Skeletal Fixation Workshop for Veterinary Practitioners. Short Course Coordinator. University of Georgia, College of Veterinary Medicine, Athens, Georgia, August 11-12, 1990.

(9 hours lectures and laboratory) External Skeletal Fixation Workshop for Veterinary Practitioners. University of Georgia, College of Veterinary Medicine, Athens, Georgia, August 11-12, 1990.

Experimental and Clinical Experience with an IM Pin/External Skeletal Fixator Tie-In Configuration for Fractures of the Humerus and Femur. Department of Anatomy and Radiology Seminar Series, University of Georgia, College of Veterinary Medicine, Athens, Georgia, March, 1991.

The Living Reef Aquarium System. Fish Diseases Short Course, University of Georgia, College of Veterinary Medicine, Athens, Georgia, August 11, 1991.

External Skeletal Fixation Workshop for Veterinary Practitioners. Short Course Coordinator. University of Georgia, College of Veterinary Medicine, Athens, Georgia, September 21-22, 1991.

(9 hours lectures and laboratory) External Skeletal Fixation Workshop for Veterinary Practitioners. University of Georgia, College of Veterinary Medicine, Athens, Georgia, September 21-22, 1991.

*In Vitro* mechanical performance of seven external skeletal fixation pins. Department of Small Animal Medicine Seminar Series (Surgery), University of Georgia, College of Veterinary Medicine, Athens, Georgia, April, 1992.

Radius / Ulna Fracture. Problem Solving in Small Animal Surgery. University of Georgia, College of Veterinary Medicine, Athens, Georgia, November 14, 1992.

Updated Use of External Skeletal Fixation and IM Pins. Short Course and Laboratory Coordinator. University of Georgia, College of Veterinary Medicine, Athens, Georgia, December 5-6, 1992.

(11.5 hours lectures and laboratory) Updated Use of External Skeletal Fixation and IM Pins. University of Georgia, College of Veterinary Medicine, Athens, Georgia, December 5-6, 1992.

Radius / Ulna Fracture. Problem Solving in Small Animal Surgery. University of Georgia, College of Veterinary Medicine, Athens, Georgia, November 14, 1992.

Orthopedics for the Practitioner. The Greater St. Louis Veterinary Medical Association. St. Louis, MO, April 2, 1993.

The Knee With Cruciate Ligament Disease. Problems in Small Animal Surgery. University of Georgia, College of Veterinary Medicine, Athens, Georgia, January 22, 1994.

(12 hours coordinator, lectures, and laboratory) The External Skeletal Fixation System: Updated Use of Fixators, Pins, and Wire. University of Georgia, College of Veterinary Medicine, Athens, Georgia, March 12-13, 1994.

(12 hours coordinator, lectures, and laboratory) The External Skeletal Fixation System: Updated Use of Fixators, Pins, and Wire (repeat offering). University of Georgia, College of Veterinary Medicine, Athens, Georgia, August 13-14, 1994.

Studies & Experiences With Joint Immobilization. Minnesota Mining and Manufacturing Company, St. Paul, Minnesota August 18, 1994.

Practical Techniques for Fractures. Central Florida Academy of Veterinary Medicine, Orlando, Florida, November 19, 1994.

Fracture Complications. Central Florida Academy of Veterinary Medicine, Orlando, Florida, November 19, 1994.

Update on Cranial Cruciate Ligament Disease. Central Florida Academy of Veterinary Medicine, Orlando, Florida, November 20, 1994.

Emergency Treatment of Musculoskeletal Injuries. Central Florida Academy of Veterinary Medicine, Orlando, Florida, November 20, 1994.

(1.5 hours lectures) Urinary and Joint Problems: Viewpoints of the Surgeons, University of Georgia, Athens, GA, January 21, 1996.

(Six hours lectures) South Carolina Academy of Small Animal Medicine, Palm Island, South Carolina, March, 1996.

Future Look Into External Skeletal Fixation, University of Georgia, College of Veterinary Medicine, Department of Small Animal Medicine, Athens, GA, October 30, 1998.

(Six hours) Your Place My Place, Dr. Bob Dickinson, University of Georgia, College of Veterinary Medicine, Duluth, GA, March 9, 1999.

Basic fracture fixation with emphasis on the ESF system. 4 hours. Also published in Proceedings GVMA Annual Convention 2006, Destin, FL June 2006.

Laboratory: Basic fracture fixation with emphasis on the ESF system. 8 hours (2 separate laboratories). Also published in Proceedings GVMA Annual Convention 2006, Destin, FL June 2006.

Instructional Course for Tibial Tuberosity Advancement (TTA) for Cranial Cruciate Deficient Stifle in Dogs, Al Bahr Shriners Temple, San Diego, CA, April 4, 2008.

### **Sessions Organized**

Coordinator, Air Instrument Surgery and Wet Laboratory. Sacramento Valley Veterinary Medical Association, January 6, 1980.

Coordinator, Arthritis and Other Joint Diseases. University of Georgia, College of Veterinary Medicine, Athens, Georgia, October 27-28, 1983.

Coordinator, Selective Joint Surgery: A Wet Laboratory Exercise. University of Georgia, College of Veterinary Medicine, Athens, Georgia, February 10, 1984.

Coordinator, Selective Joint Surgery: A Wet Laboratory Exercise. University of Georgia, College of Veterinary Medicine, Athens, Georgia, March 9, 1984.

Coordinator, Canine Surgery Workshop. University of Georgia, College of Veterinary Medicine, Athens, Georgia, November 22-23, 1985.

Coordinator, External Skeletal Fixation Workshop for Veterinary Practitioners. University of Georgia, College of Veterinary Medicine, Athens, Georgia, August 26-27, 1989.

Coordinator, External Skeletal Fixation Workshop for Veterinary Practitioners. University of Georgia, College of Veterinary Medicine, Athens, Georgia, August 11-12, 1990.

Chairman, Special Trauma Workshop. Fracture Management, Wounds, Sepsis Control. 2nd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 16, 1990.

Assistant Chairman, External Skeletal Fixation Laboratory. 18th Veterinary Surgical Forum, Chicago, Illinois, October 29, 1990.

Chairman, External Skeletal Fixation Laboratory. 1991 Eastern States Veterinary Conference, Orlando, Florida, January 12, 1991.

Chairman, External Skeletal Fixation Laboratory. 19th Veterinary Surgical Forum, San Francisco, California, October 15, 1991.

Coordinator, External Skeletal Fixation Workshop for Veterinary Practitioners. University of Georgia, College of Veterinary Medicine, Athens, Georgia, September 21-22, 1991.

Chairman, External Skeletal Fixation Laboratory. 3rd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 21, 1992.

Chairman, Wound Management: Materials & Techniques Laboratory. 3rd International Veterinary Emergency & Critical Care Symposium, San Antonio, Texas, September 21, 1992.

Co-Coordinator, Laboratories I & II Instrumentation: External Skeletal Fixation, Intramedullary Pins, Wire. 1st Complete Course in External Fixation, Austin, Texas, October 5, 1992.

Coordinator, Updated Use of External Skeletal Fixation and IM Pins. University of Georgia, College of Veterinary Medicine, Athens, Georgia, December 5-6, 1992.

Co-Coordinator, Laboratories I & II Instrumentation: External Skeletal Fixation, Intramedullary Pins, Wire. 2nd Annual Complete Course in External Skeletal Fixation, Austin, Texas, October 4, 1993.

Coordinator, Fixation Laboratories I & II. Pins, Wire, and ESF: 21st Veterinary Surgical Forum, San Francisco, California, October 25, 1993.

Chairman, External Skeletal Fixation System: IM Pins, Wire, & Fixator Laboratory. 61st Annual Meeting of the American Animal Hospital Association, Boston, Massachusetts, March 8, 1994.

Chairman, External Skeletal Fixation System: IM Pins, Wire, & Fixator Laboratory (Japanese Session). 61st Annual Meeting of the American Animal Hospital Association, Boston, Massachusetts, March 9, 1994.

Coordinator, The External Skeletal Fixation System: Updated Use of Fixators, Pins, and Wire. Short Course and Laboratory. University of Georgia, College of Veterinary Medicine, Athens, Georgia, March 12-13, 1994.

Coordinator, The External Skeletal Fixation System: Updated Use of Fixators, Pins, and Wire. Short Course and Laboratory. University of Georgia, College of Veterinary Medicine, Athens, Georgia, August 13-14, 1994.

Coordinator, Laboratory 3A: Application of External Skeletal Fixation to the Femur. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 3, 1994.

Coordinator, Laboratory 3B: Application of External Skeletal Fixation to the Humerus. 3rd Annual Complete Course in External Skeletal Fixation, Austin, TX, October 3, 1994.

Coordinator, External Fixation Laboratory 1 - Exercise 1. 22nd Veterinary Surgical Forum, Washington, D.C., October 19, 1994.

Coordinator, External Fixation Laboratory 2 - Exercise 2. 22nd Veterinary Surgical Forum, Washington, D.C., October 19, 1994.

Chairman and Organizer, 4<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, October 2-4, 1995.

Coordinator, External Skeletal Fixation Laboratory. 23<sup>rd</sup> Annual Surgical Forum, Chicago, IL, November 1, 1995.

Coordinator, External Skeletal Fixation Laboratory. Annual International Veterinary Congress 'de Voorjaarsdagen', April 28, 1996.

Chairman and Organizer 5<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, October 5-7, 1996.

Chairman and Organizer 6<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, September 26-29, 1997.

Coordinator and Organizer Small Animal Cranial Cruciate Injury, Athens, GA, February 27-28, 1999.

Coordinator and Organizer Second Offering: Small Animal Cranial Cruciate Injury, Athens, GA, August 28-29, 1999.

Coordinator Cruciate Ligament Disease and Postoperative Rehabilitation, Montana Veterinary Medical Association, Bozeman, MT, February 26 – 27, 2000.

Coordinator and Organizer External Skeletal Fixation Laboratories, . WSAVA – FECAVA World Congress, Amsterdam, The Netherlands, April 28, 2000.

Coordinator and Organizer Complete Course in Rehabilitation of the Dog and Cat, Athens, GA, August 19-20, 2000.

Coordinator and Organizer Complete Course in Diagnosis & Management of Cranial Cruciate Injury in the Dog, Athens, GA, August 11-12, 2001.

Coordinator and Organizer 10<sup>th</sup> Annual Complete Course in External Skeletal Fixation, Athens, GA, March 24 – 26, 2002.

Coordinator seven hours lectures, Updated Use of External Skeletal Fixation, Sponsored by B. Braun Medical Produkte & Universität Bern, Switzerland, May 13-14, 2004.

Coordinator four hours laboratories, Updated Use of External Skeletal Fixation, Sponsored by B. Braun Medical Produkte & Universität Bern, Switzerland, May 13-14, 2004.

Coordinator, Laboratory 4: Application of ESF to the Femur and Humerus, 11th Annual Complete Course in External Skeletal Fixation, West Lafayette, IN, November 14-16, 2003.

Coordinator, Laboratory 4: Application of ESF to the Femur and Humerus, 12th Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 10-12, 2004.

Coordinator, Laboratory 3: Application of ESF to the Femur and Humerus, 13th Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 17-19, 2005.

Coordinator & Organizer Laboratory: Basic fracture fixation with emphasis on the ESF system. 12 hours organization time. GVMA Annual Convention 2006, Destin, FL June 2006.

Coordinator, Laboratory 3: Application of ESF to the Femur and Humerus, 14th Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 16-18, 2006.

Coordinator, Laboratory 3: Application of ESF to the Femur and Humerus, 15th Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 21-23, 2007.

Coordinator, Laboratory 3: Application of ESF to the Femur and Humerus, 16th Annual Complete Course in External Skeletal Fixation, Ames Iowa, September 19-21, 2008.

### **International Continuing Education Video**

Application of Softcast Mobilization Aid to Facilitate Progressive Controlled Mobilization Rehabilitation for the Dog and Cat.

### **Activities Related To Service**

Surgeon, Veterinary Medical Teaching Hospital, College of Veterinary Medicine, University of Georgia, 1980 – present, Diplomate, ACVS since 1983.

Administration of ACVS certifying examination, San Diego, CA February 2008

**PUBLICATIONS: Journals**

Aron DN, Kadditz LA and Dueland R: A Review of Reduction and Internal Fixation of Proximal Femoral Fractures in the Dog and Man. J Am Anim Hosp Assoc 15:455-462, 1979.

Aron DN: Management of Delayed Union and Nonunion Fractures in Small Animals. Compend Contin Educ 1:697-703, 1979.

Aron DN: Pathogenesis, Diagnosis, and Management of Osteomyelitis in Small Animals. Compend Contin Educ 1:824-830, 1979.

Aron DN, DeVries R, and Short CE: Primary Tracheal Chondrosarcoma in a Dog: A Case Report with Description of Surgical and Anesthetic Techniques. J Am Anim Hosp Assoc 16:31-37, 1980.

Hoffer RE, MacCoy DM, Gaynor F, Moraff H, Aron DN, Quick BC and Low K: Physiological Features of the Canine Esophagus. II. Effect of Modified Esophagomyotomy. Am J Vet Res 41:723-726, 1980.

Aron DN: A New Tendon Stitch. J Am Anim Hosp Assoc 17:587-591, 1981.

Aron DN: Emergency Management of the Musculoskeletal Trauma Patient. Compend Contin Educ 4:220-226, 1982.

Aron DN and Kornegay JN: The Clinical Significance of Traumatic Lung Cysts and Associated Pulmonary Abnormalities in the Dog and Cat. J Am Anim Hosp Assoc 19:903-912, 1983.

Lappin MR, \*Aron DN, Herron HL and Malnati G: Fractures of the Radius and Ulna in the Dog. J Am Anim Hosp Assoc 19:643-650, 1983.

Aron DN and Toombs JP: Updated Principles of External Skeletal Fixation. Compend Contin Educ 6:845-868, 1984.

Aron DN and Crowe DT: Upper Airway Obstruction: General Principles and Selected Conditions in the Dog and Cat. Vet Clin N Am 15:891-917, 1985.

Aron DN, Mahaffey MB and Rowland GN: Free Chondral Fragment Involving the Lateral Trochlear Ridge of the Talus in a Dog. J Am Vet Med Assoc 186:1095-1096, 1985.

Aron DN and Purinton PT: Collateral Ligaments of the Tarsocrural Joint - An Anatomic and Functional Study. Vet Surg 14:173-177, 1985.

Aron DN and Purinton PT: Replacement of the Collateral Ligaments of the Canine Tarsocrural Joint: A Proposed Technique. Vet Surg 14:178-184, 1985.

Aron DN, Rowland GN and Barber DC: Report of an Unusual Case of Ectopic Ossification and Review of the Literature. J Am Anim Hosp Assoc 21:819-829, 1985.

Aron DN and Toombs JP: Primary Treatment of Severe Fractures by External Skeletal Fixation. Threaded Pins Compared with Smooth Pins. J Am Anim Hosp Assoc 22:659-670, 1986.

Aron DN: Prosthetic Ligament Replacement for Severe Tarsocrural Joint Instability. J Am Anim Hosp Assoc 23:41-55, 1987.

Aron DN and Crowe DT: The 90-90 Flexion Splint for Prevention of Stifle Joint Stiffness with Femoral Fracture Repairs. J Am Anim Hosp Assoc 23:447-454, 1987.

Basinger RR, \*Aron DN, Crowe DT and Purinton PT: Osteofascial Compartment Syndrome in the Dog. Vet Surg 16:427-434, 1987.

Aron DN and Gorse MJ: Tissue Adhesives for Orthopedic Use - An Overview. Veterinary Forum, September, 1988.

Palmer RH, \*Aron DN and Purinton PT: Relationships of Femoral Intramedullary Pins to the Sciatic Nerve and Gluteal Muscles After Retrograde and Normograde Insertion. Vet Surg 17:65-70, 1988.

Aron DN: Traumatic Dislocation of the Stifle Joint: Treatment of 12 Dogs and One Cat. J Am Anim Hosp Assoc 24:333-340, 1988.

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\*originated project & directed first author

### **Other**

Our finite element analysis research featured in PRO DIGITAL DIGEST, ENGINEERING TALK, and MEDICAL DESIGN. All three are independent e-newsletters for engineers.

### **PUBLICATIONS: In Progress**

Modifying External Skeletal Fixators – A Finite Element Study Comparison of the IMEX™ SK and IMEX™ KE Device.

Improving Proficiency with External Skeletal Fixation: Current Concepts and an Updated Decision-Making Tool – The Fracture Assessment Score (FAS).

Descriptive and Mechanical Comparison of Two Linear External Skeletal Fixation Devices: IMEX™ SK Versus the IMEX™ KE. (pulled from original review to update to current FEM technique).

A New Approach For Teaching Veterinary Students To Remain Active Thinkers: A Laboratory Exercise.

Book: The External Skeletal Fixation System.

Book: Physical Therapy for the Dog and Cat.

Book Chapter: 90° - 90° Flexion Bandage for Distal Femoral Fractures. *Current Techniques in Small Animal Surgery*, fifth edition.

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Rasheed K, Aron DN: GUI and Machine Learning Techniques for External Skeletal Fixator Educational Tool. Faculty Research Grants Program, UGA VP of Research, \$5,000, January 2004.

Aron DN: Clinical Evaluation of Tibial Tuberosity Advancement for Treatment of Cruciate Ligament Disease in the Dog. Kyon Veterinary Surgical Products, Zurich Switzerland, May 2004, \$8,985 (equipment, material).

Rasheed K, Aron DN: CAREER: A Framework for Modeling, Evaluation and Design in Biomedical Domains. National Science Foundation, \$478,000 (60 months), July 2004, not funded.

Aron DN, Choi I: Developing Multimedia-Based Case Training for Small Animal Orthopedic Surgery. Committee for Academic and Instructional Technologies (CAIT), University of Georgia, November 2005, \$22,030.

Aron DN: Percutaneous injection of hydroxyapatite to enhance bone healing. Kyon, Zurich Switzerland 2005, estimated value ~ \$2,000.

## **RECENT COLLABORATIVE RESEARCH**

### **Finite Element Analysis of External Skeletal Fixation, 1992 – present.**

External skeletal fixation is a management system that lends itself to literally infinite structural possibilities for stabilization of a bone structure. Finite element analysis is an engineering process

that quantifies the magnitude and direction of forces acting on structures. This research allows us to assess the inherent stability of structures in question, compare the effects of different interventions with external skeletal fixation designed to stabilize the structure, and thereby, predict which interventions should be used and which should be discarded. This tool allows data processing, which used to take months, to be accomplished in hours, animal use is unnecessary, and in many cases the science is more accurate than with traditional MTS techniques.

DN Aron, DVM.

MD Evans, PhD, Previously, Faculty Department of Biological and Agricultural Engineering, University of Georgia; Currently, Engineer John Deer Corp, Augusta, Georgia (existing consultant on project).

G Zhang, PhD, Department of Biological & Agricultural Engineering, University of Georgia.

Susanne Lauer, DVM, Department of Veterinary Clinical Sciences, Louisiana State University.

Heidi Radke, DVM, Department of Small Animal Medicine and Surgery, University of Bern, Switzerland.

### **Promoting Active Learning Through Computer Simulation of Fracture Management, 1998 – 2006.**

The goals of this project are to: 1) develop a user-friendly software package that incorporates finite element analysis, artificial intelligence, realistic graphical representation of fractured bones, and the components of fracture fixation devices, 2) facilitate active, self-directed learning processes by providing students the ability to test their own fracture fixation devices and 3) expose students in engineering and medical disciplines to the basic principles of the other discipline. The program will allow the engineering students to markedly increase the number of fracture fixation devices they can design and test. The medical students' awareness of the effects of mechanical and biological factors on bone healing will increase and these students will become interested in predicting which fracture fixation devices should be used in specific clinical cases. Upon completion of this project, three needs will be addressed: 1) improved training of engineering students interested in careers in the health sciences, 2) exposure of medical students to bioengineering principles, and 3) promotion of active learning experiences for all students.

DN Aron, DVM.

K Rasheed, PhD, Artificial Intelligence Center, Department of Computer Science, University of Georgia.

G Zhang, PhD, Department of Biological & Agricultural Engineering, University of Georgia.

Eileen Kraemer, PhD, Computer Science, Department of Computer Science, University of Georgia.

### **Advanced Junior Surgery Teaching Project, 2002-2006.**

I have been involved with various professional educators for several years with my clinical teaching. They have become very interested with the way I teach my week of the advanced Junior Surgery Course. The current educator I am working with is Ikseon Choi (Ike). With the Advanced Junior surgery course what Ike finds novel is the way we encourage the students to practice active thinking through their pre-operative plan, intraoperative implementation, and postoperative reflection.

Unique to this learning experience is showing each student that fracture treatment is not an exercise in linking patient radiographs to textbook illustrations to find a recommended treatment. This cookbook process (passive thinking) is clinically “dangerous” as it ignores critical variables that should be incorporated into logical treatment planning. The students are exposed to a fracture decision making process that shows them that there is much more to successful fracture treatment than simply copying a picture from a text, which is typical of most teaching at the junior surgery level. Together Ike and I are actively involved with writing up these methods for publication.

DN Aron, DVM, Department of Small Animal Medicine and Surgery, University of Georgia.

Ikseon Choi, PhD, Department of Educational Psychology and Instructional Technology, University of Georgia.

### **Developing Multimedia-Based Case Training for Small Animal Orthopedic Surgery, 2005-2007**

Veterinary medicine is a profession, which demands subtle judgment and dynamic decision-making. Helping future veterinarians understand the complex and dynamic nature of veterinary medicine and effectively exercise their judgment based on analytical and reflective thinking is a critical aspect in veterinary education. In this project, we collaborate to develop and implement multimedia-based case training through which prospective veterinarians are exposed to various small animal orthopedic surgery cases and how experts think and react to the cases. This innovative training will enhance prospective veterinarian’s reasoning and dynamic decision-making skills and their awareness of multiple perspectives and diverse ways of problem solving.

DN Aron, DVM, Department of Small Animal Medicine and Surgery, University of Georgia.

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### **Rehabilitation – Progressive Controlled Mobilization, 1985-present**

Over the years I have spent considerable time working out effective rehabilitation techniques that owners can easily perform at home to enhance veterinary orthopedic surgical procedures. Currently, many veterinary rehabilitation devices (such as the underwater treadmill) are effective

but are not practical for the day-to-day requirements needed to gain a high level of muscle strength necessary after surgery. We have developed muscle-building techniques that only require common devices owned by almost all clients (i.e. step ladder). Since acquiring an underwater treadmill, I have initiated evaluation techniques designed to compare the underwater treadmill to my practical methods. 2005-2006 the effort involves my continuing education post-doctoral student, Dr. Rubio, to help with the clinical studies. These studies have strong potential impact for veterinary orthopedics as it is well known that for muscle-building and range-of-motion exercises to be maximally effective they need to be conducted at least a couple of times every day as the patient is going through the muscle rebuilding phase of rehabilitation (progressive controlled mobilization). Practical techniques that can be done daily and easily by the animal owner are important to be able to satisfy this requirement.

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Dr. Alejandro Rubio, Veterinarian: Personal Continuing Education and Research – (October 4, 2005 – June 26, 2006)

G Zhang, PhD, Department of Biological & Agricultural Engineering, University of Georgia.

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