

Anat V. Lubetzky, PT, PhD

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RESEARCH INTERESTS:

Sensory Integration for Postural Control, Virtual Reality for Rehabilitation, Balance Training, Motor Control and Learning, Specificity in Orthopaedic Rehabilitation.

APPOINTMENTS:

August 2015–Present Tenure-Track Assistant Professor
New York University, Department of Physical Therapy
Sep 2014–July 2015 Visiting Assistant Professor
New York University, Department of Physical Therapy

EDUCATION:

2008–2014 PhD in Rehabilitation Science at the University of Washington
under the supervision of Sarah Westcott McCoy, PT, PhD, FAPTA.
Dissertation title: “Sensory Integration for Postural Control during Stance
on Compliant Surfaces: from Theoretical Models to Balance
Rehabilitation”
2003–2006 MScPT, Tel Aviv University, Department of Physical Therapy
under the supervision of Dr. Eli Carmeli and Dr. Michal Katz-Leurer.
Thesis title: “Incidence of injuries among young adults in sports centers –
relation to the type and pattern of activity”
1999–2003 BPT (Magna Cum Laude), Tel Aviv University, Department of Physical
Therapy

HONORS AND AWARDS:

- Nominated: Steinhardt Teaching Excellence Award [2019]
- W. Gabriel Carras Research Award for a Promising Young Scholar [2017-2018]
- UW Commencement Gonfalonier: honor selection to represent the Graduate School for outstanding achievements at the University of Washington [2014]
- Nominated: UW Graduate School Distinguished Dissertation Award [2014]

- Walter C. and Anita C. Stolov Research Award, Department of Rehabilitation Medicine, University of Washington [2012, 2010]
- Nominated: UW Excellence in Teaching Award [2012]
- Lead instructor of the highest rated course in the University of Washington, School of Medicine for summer 2011, based on adjusted average students' ratings (REHAB 508) [2011]
- The annual Dean's list award, Department of Physical Therapy, Sackler School of Medicine, Tel Aviv University [2002, 2001, 2000]
- The annual Rector's list award for excellence, Sackler School of Medicine, Tel Aviv University. (Given to a student at the Department of Physical Therapy once every four years) [1999]

PUBLICATIONS

1. **A. V. Lubetzky**, A. Soroka, D. Harel, T. Errico, J. Bendo, S. Shabat, E. Ashkenazi, Y. Floman, M. Moffat, Y. Masharawi. Static and dynamic balance in adults undergoing lumbar spine surgery: Screening and Prediction of Post-Surgical Outcomes. *J Am Acad Orthop Surg*. Accepted August 2019.
2. **A. V. Lubetzky**, Z. Wang, T. Krasovsky. Head Mounted Displays for Capturing Head Kinematics in Postural Tasks. *J Biomech*. 2019: 86: 175-182
3. **A. V. Lubetzky**, J. Kelly, Z. Wang, M. TaghaviDilamani, M. Gospodarek, G. Fu, E. Kuchlewski, B. D. Hujsak. Head Mounted Display Application for Contextual Sensory Integration Training: Design, Implementation, Challenges and Patient Outcomes. IEEE ICVR Conference, July 2019
4. M. A Aharoni, **A. V. Lubetzky**, Z. Wang, M. Goldman, T. Krasovsky. A Virtual Reality Four-Square Step Test for Quantifying Dynamic Balance Performance in People with Persistent Postural Perceptual Dizziness. IEEE ICVR Conference, July 2019
5. **A.V. Lubetzky**, B.D. Hujsak, J.L. Kelly, G. Fu K. Perlin. Control mechanisms of static and dynamic balance in adults with and without vestibular dysfunction in Oculus virtual environments. *PM R*. 2018: 10(11): 1223-1236.e2.
6. **A.V. Lubetzky**, B.D. Hujsak, G. Fu K. Perlin. An Oculus Rift Assessment of Dynamic Balance via Head Mobility in a Virtual Park Scene: A Pilot Study. *Motor Control*. 2018: 5: 1-16
7. **A.V. Lubetzky**, B.D. Hujsak. A Virtual Reality Head Stability Test for Patients with Vestibular Dysfunction. *J Vestib Res*. 2018;28(5-6):393-400.
8. **A.V. Lubetzky**, D. Harel, E. Lubetzky. On the Effects of Signal Processing on Sample Entropy for Postural Control. *PLoS ONE*. 2018. 13(3): e0193460.2018.
9. **A.V. Lubetzky**, E. Kary, D. Harel, B.D. Hujsak, K. Perlin. Feasibility and Reliability of a Virtual Reality Oculus Platform to Measure Sensory Integration for Postural Control in Young Adults. *Physiother Theory Pract*. 2018: 34(12): 935-950.

10. **A.V. Lubetzky**, B. Hujsak, E. Kary, H. Darmanin, K. Perlin. An Oculus Platform to Measure Sensory Integration for Postural Control in Patients with Vestibular Dysfunction. *IEEE ICVR Conference Proceedings*. 2017.
11. **A.V. Lubetzky**, D. Harel, H. Darmanin, K. Perlin. Assessment via the Oculus of Visual 'Weighting' and 'Re-weighting' in Young Adults. *Motor Control*. 2017: 21(4): 468-482
12. **A.V. Lubetzky**, S.W. McCoy, R. Price, D. Kartin. Response to Tendon Vibration Questions the Underlying Rationale of 'Proprioceptive Training'. *J Athl Train*. 2017: 52(2): 97-107
13. **A.V. Lubetzky**, R. Price, S.W. McCoy. Effects of Achilles Tendon Vibration Surface and Visual Conditions on Lower Leg Electromyography in Young Adults with and without Recurrent Ankle Sprain. *J Bodywork Mov Ther*. 2016: 20(3): 639-49
14. Y. Segal-Snir Yael, **A.V. Lubetzky**, Y. Masharawi. Rotation exercise classes did not improve function in women with non-specific chronic low back pain: a randomized single blind controlled study. *J Back Musculoskelet Rehabil*. 2016: 29(3): 467-75.
15. **A.V. Lubetzky**, S. Westcott-McCoy, R. Price, M. Ciol. Young Adults Largely Depend on Vision for Postural Control when Standing on a BOSU Ball but Not on Foam. *J Strength Cond Res*. 2015: 29: 2907-18.
16. **A.V. Lubetzky**, R. Price, V.E. Kelly, S.W. McCoy. Relationship between Multiscale Entropy, task difficulty and sway velocity in healthy young adults. *Somatosens Mot Res*. 2015: 32: 211-218.
17. **A.V. Lubetzky**, P.A. Kramer. The Association between Foot Morphology and Dynamic Balance Performance. *J Exercise Sports Ortho*. 2015: 2: 1-7
18. **A. Lubetzky-Vilnai**, M. Ciol, S. Westcott-McCoy. Statistical Analysis of Clinical Prediction Rules for Rehabilitation Interventions: Current State of the Literature. *Arch Phys Rehab Med*. 2014: 95: 188-96
19. T.L. Jirikowic, S. Westcott-McCoy, **A. Lubetzky-Vilnai**, R. Price, M. Ciol, D. Kartin, L. Hsu, B. Gendler, S.A. Astley. Sensory control of balance: A comparison of typically developing children to children with fetal alcohol spectrum disorders. *J Pop Ther Clin Pharm*. 2013: 20: e212-28
20. **A. Lubetzky-Vilnai**, T.L. Jirikowic and S. Westcott McCoy. Investigation of the Dynamic Gait Index in Children: a Pilot study. *Pediatr Phys Ther*. 2011: 23(3): 268-73
21. **A. Lubetzky-Vilnai**, D. Kartin. The Effect of Balance Training On Balance Performance in Patients Post-Stroke: A Systematic Review. *J Neurol Phys Ther*. 2010: 34(3):127-37.

22. **A. Lubetzky-Vilnai**, E. Carmeli, M. Katz-Leurer. Incidence of injuries among young adults in sports centers- relation to the type and pattern of activity. *Scand J Med Sci Sports*. 2009; 19: 828–33

GRANTS

1. Vestibular Rehabilitation utilizing Virtual Environments to Train Sensory Integration for Postural Control in a Functional Context
Agency: NIH REACT
PI: Anat Lubetzky
Status: Funded July 19 – August 20
Amount: \$63,401
2. A balancing act in hearing and vestibular loss: assessing auditory contribution to multisensory integration for postural control in an immersive virtual environment
Agency: Hearing Health Foundation
PI: Anat Lubetzky
Co-PI: Dr. Maura Cosetti, New York Eye and Ear Infirmary of Mount Sinai
Status: Funded July 19 – August 20
Amount: \$30,000
3. Overground Walking in Virtual Environments: A Sensitive Assessment of Balance in Older Adults
Agency: NYU, Aging Incubator, Annual Innovators in Aging Award
Students: Zhu Wang (team leader), Marta Gospodarek, Rufei Sheng
Advisors: Anat Lubetzky & Ken Perlin
Status: Funded July 19 – August 20
Amount: \$10,000
4. Integrated Subject-Specific Measure of Balancing: Robotic Control Approach for Human Stability
Agency: NYU, URCF
PI: Prof. Joo Hyun Kim, NYU Tandon
Co-PI: Anat Lubetzky
Status: Funded July 19 – August 20
Amount: \$14,000
5. Balance Rehabilitation and Assessment using Virtual Environments
Agency: NYU, Technology Acceleration and Commercialization Program
PI's: Anat Lubetzky, Ken Perlin and Ivan Selesnick
Status: Funded Sept 17 – August 18
Amount: \$49,710
6. Virtual Reality Clinical Assessment of Visuomotor Function and Visual Integration

for Postural Control for Patients with Vestibular Dysfunction
Agency: NYU, Steinhardt School of Culture Education and Human Development
PI's: Anat Lubetzky & Ken Perlin
Co-investigators: Dr. Bryan Hujsak, Dr. Daphna Harel
Status: Funded Sept 16 – August 17
Amount: \$10,000

7. Clinical, Morphological and Functional Success Predictors Following Lumbar Spinal Surgery in Patients with Chronic Low Back Pain and Degenerative Disorders Phase 1: a Pilot Study
Agency: NYU, University Research Challenge Fund
PI's: Anat Lubetzky & Marilyn Moffat
Co-investigators: Dr. Youssef Masharawi, Dr. Daphna Harel, Dr. Thomas Errico
Status: Funded June '15 – June 16
Amount: \$11,000

INVITED TALKS:

- Head Mounted Displays for Assessment and Training of Contextual Sensory Integration in Vestibular Rehabilitation. Invited talk in Columbia University, Movement Science Research Seminar, March 2019.
- Physical Therapy Following Lumbar Spine Surgery: Comprehensive Spine Course, NYU Langone Health, October 2018
- Lightening talk at: NYU Health Tech Symposium, NYU Langone Health, June 2018.
- Head Mounted Displays for Contextual Sensory Integration. Invited talk in Rusk Rehabilitation Annual Research Symposium, NYU Langone Health, April 2018.
- Head Mounted Displays for Contextual Sensory Integration in Vestibular Rehabilitation. Invited talk in Virtual Reality and Health Symposium, Harvard Medical Center, March 2018.
- Virtual Reality for Clinical Research of Postural Control: An Interdisciplinary Approach. University of Haifa, Symposium on Technology and Health, December 2017.
- A Virtual Reality Oculus Platform to measure Postural Control. Center of Health and Rehabilitation Research Inaugural Research Symposium, September 2017.
- A Virtual Reality Application in Physical Therapy and Balance Rehabilitation. Invited talk in AR in Action Leadership Summit in New York City, June 2017.
- MIT Enterprise Forum of NYC Panel: The Reality in Virtual Reality: A Conversation with Practitioners. Microsoft Technology Center, New York, December 2016.
- Lightening talk at: NYU Steinhardt HealthTech: Apps, Gadgets and Gizmos, April 2016.

- Critical Inquiry of Clinical Prediction Rules in Physical Therapy Research. Tel Aviv University, Department of Physical Therapy, January 2016.

EDUCATIONAL SESSIONS:

- Z. Wang, M. TaghaviDilamani, **A. V. Lubetzky**. Virtual Reality Rehabilitation for Fall Prevention: Presentation and demo at the NYU Technology Summit, November 2018.
- **A. V. Lubetzky**, J. Kelly. B. D. Hujsak, M. Moffat. How Virtual Environments Via Head Mounted Display Can Expand Our View of Balance. To be presented at APTA NEXT, June 2019.

PLATFORM PRESENTATIONS:

- Sensory Substitution quantified via the Oculus Rift in Patients with Vestibular Dysfunction. The 30th Bárány Society Meeting, Uppsala, Sweden, June 2018.
- Quantifying Visual Re-weighting via the Oculus in Adults with Vestibular Dysfunction. APTA Combined Sections Meeting, Research Section, New Orleans, February 2018.
- A Virtual Reality Oculus Platform to measure Sensory Integration for Postural Control. World Confederation of Physical Therapy Congress, Cape Town, South Africa, July 2017.
- An Oculus Platform to Measure Sensory Integration for Postural Control in Patients with Vestibular Dysfunction.
 - International Conference on Virtual Rehabilitation, Montréal, Canada, June 2017.
 - Annual Conference of the Israeli Physiotherapy Society, Tel Aviv, Israel, May 2017
- Assessment of Visual Dependence for Postural Control in Young Adults using the Oculus Development Kit. APTA Combined Sections Meeting, Research Section, San Antonio, February 2017.
- Effects of Achilles Tendon Vibration of Lower Leg Electromyography during Balance Tasks in Young Adults with and without Recurrent Ankle Sprains. APTA Combined Sections Meeting, Sports Physical Therapy section, Anaheim, February 2016. Published Abstract: *JOSPT*, 2016; 46 (1) A45

- Vibration Induced Falling or Stability: Effects during Stance on Challenging Compliant Surfaces in Young Adults with and without history of repeated ankle sprains. APTA Combined Sections Meeting, Sports Physical Therapy section, Indianapolis, February 2015. Published Abstract: *JOSPT*, 2015; 45 (1) A55
- Sensory Integration for Postural Control: from theoretical models to balance rehabilitation. Invited online talk, Tel Aviv University, Department of Physical Therapy, Conference on Updates in Orthopaedic Rehabilitation, January 2015
- Research and Scientific Inquiry Presentation “‘Rehabilitation Gaming’ for Improvement of Neurological Function & Adherence with Movement Practice in Children with Cerebral Palsy”, UW Department of Rehabilitation Medicine Research Seminar, November 2010.
- Prevalence of injuries among young adults in sport centers: relation to the type and pattern of activity
 - The Annual Meeting of the Israel Society of Sports Medicine, Tel Aviv, April 2007.
 - The 57th Annual Convention of the Israeli Organization of Physical Medicine and Rehabilitation, Airport City, Israel, November 2006.

ABSTRACT PRESENTATIONS BY STUDENTS:

- Dynamic balance assessment in a virtual environment among people with Persistent-postural perceptual dizziness. Israel Physical Therapy Society Annual Conference, June 2019. Presented by: Mosh Aharoni (MA student, co-mentored with Tal Krasovsky, University of Haifa)
- Static and dynamic balance in adults undergoing lumbar spine surgery: Screening and prediction of post-surgical outcomes. Israel Physical Therapy Society Annual Conference, June 2019. Presented by: Avihai Sorokoa (PhD student, co-mentored with Youssef Masharawi, Tel Aviv University)

HIGH SCHOOL STUDENTS MENTORING:

- The student: Giovanni Santucci
Title of project: Sensory integration in adolescents with or without a history of multiple concussion.
School: Ossining High School
Dates: 2016-2019
Outcome: INTEL ISEF 2019: 1st place in Behavioral Science (\$10,000 award)
- The student: Alexa Shaw
Title of project: Virtual Reality's Effectiveness in Reducing Anxiety and Stress in High School Students
School: Ossining High School

Dates: 2019 –

Outcome: Somers Science Fair 2019: 1st place in Behavioral Science

POSTER PRESENTATIONS

1. A. V Lubetzky, B. D Hujsak, J. L Kelly, G Fu, K Perlin
Control mechanisms of static and dynamic balance in adults with and without vestibular dysfunction in Oculus virtual environments.
APTA Combined Sections Meeting, Washington DC, January 2019
2. A. V Lubetzky, J. Kelly, L Lei Rivera, S Krishnamoorthy, J Hernandez, J Sutura, K Perlin, B.D Hujsak
Contextual Sensory Integration via an HTC Vive app in Vestibular Rehabilitation: A Usability Study
APTA Combined Sections Meeting, Washington DC, January 2019
3. A. V Lubetzky, J. L Kelly, G Fu, K Perlin, B. D Hujsak
Head Mobility in Virtual Environments: A Novel Oculus Rift Assessment for Patients with Vestibular Dysfunction
International Conference for Vestibular Rehabilitation, Chicago, August 2018
4. A. V Lubetzky, B. D Hujsak, J. L Kelly
HTC Vive to improve balance and dizziness in unilateral peripheral hypofunction: 2 case reports
The 30th Bárány Society Meeting, Uppsala, Sweden, June 2018.
5. A. V Lubetzky, J.L Kelly, G Fu, B. D. Hujsak, K Perlin
Balance Rehabilitation and Assessment using Virtual Reality Environments for a Patient with Bilateral Vestibular Dysfunction
APTA Combined Sections Meeting, New Orleans, February 2018
6. A.V Lubetzky, Y. Masharawi, A. Soroka, PT, T. Errico, J Bendo, S Shabat, E. Ashkenazi, Y. Fluman, D. Harel, M. Moffat.
A sensitive, comprehensive and quick assessment for patients undergoing lumbar spine surgery
NYPTA Conference, Troy, NY, October 2017
7. A.V Lubetzky, Y. Masharawi, D. Harel, J. Burr, T. Errico, J. Bendo, M. Moffat
Body Functions, Activity Limitations and Participation Restrictions in patients with chronic low back pain who choose to undergo lumbar spine surgery.
APTA Combined Sections Meeting, San Antonio, February 2017
8. A. Lubetzky-Vilnai, S. Westcott McCoy, R. Price, V. Kelly, M. Ciol
Measurement of postural-sway complexity in young adults with and without history of repeated ankle sprains.
APTA Combined Sections Meeting, Indianapolis, February 2015
9. S. Kreisman, A. Lubetzky-Vilnai, S. Westcott McCoy

Relationship of single-limb Balance Error Scoring System and postural sway on stable and compliant surfaces in young adults with and without history of ankle sprains.

APTA Combined Sections Meeting, Indianapolis, February 2015

10. A. Lubetzky-Vilnai, S. Westcott McCoy, R. Price, A. Bennett, D. Kartin
The Role of Compliant Surfaces in Somatosensory Evaluation and Rehabilitation: a Pilot Study.
APTA Combined Sections Meeting, San Diego, January 2013
11. A. Lubetzky-Vilnai, PA. Kramer.
The Role of Foot Type in Dynamic Balance Performance.
ACSM Annual Meeting, San Francisco, May 2012
12. A. Lubetzky-Vilnai, T. Jirikowic, R. Price, B. Dellon, M. Ciol, D. Rios, D. Kartin, S. Westcott McCoy.
Comparison of sensorimotor and postural control in children with and without fetal alcohol spectrum disorders.
APTA Combined Sections Meeting, Chicago, February 2012
13. S. Westcott McCoy, A. Lubetzky-Vilnai, T. Gilbertson, R. Price, D Rios, C. Moritz.
Exploration of Technology use for Enjoyable Task-Specific Practice to Improve Selective Volitional Muscle Activation in Children with Cerebral Palsy.
World Conference of Physical Therapy, Amsterdam, Netherlands, June 2011
14. S. Griffith, A. Lubetzky Vilnai, T. Jirikowic, S. Westcott McCoy.
Test Re-Test Reliability of the Multimodal Balance Entrainment Response System (MuMBER).
Annual Medical Student Poster Session, University of Washington, November 2010
15. S. Westcott McCoy, T. Jirikowic, R. Price, B. Dellon, A. Lubetzky Vilnai, M. Ciol, B. Gendler, S. Astley, D. Kartin.
Sensorimotor Training for Balance to Effect Engagement and Learning (STABEL). Taking the Next Step: Innovative Interventions for Fetal Alcohol Spectrum Disorders, Emory University School of Medicine, Atlanta, October 2010
16. B. Dellon, D. Kartin, A. Lubetzky-Vilnai, S. Westcott McCoy, R. Price, K. Washington, M. Ciol.
Developing a Multi-Modal Balance Entrainment Response (MuMBER) System: A Comparison of Goggle vs. Screen Delivery.
25th Annual Justus F. Lehmann Day Symposium, Center for Urban Horticulture, University of Washington, May 2010
17. A. Lubetzky-Vilnai, D. Kartin.
The Effect of Balance Training On Balance Performance in Patients Post-Stroke: A Systematic Review.
25th Annual Justus F. Lehmann Day Symposium, Center for Urban Horticulture, University of Washington, May 2010

TEACHING:

New York University (2017– present):

- Applied Anatomy & Physiology of the Neuromuscular System- PT-GE 2232 (3 Cred.)

New York University (2014 – present):

- Critical Inquiry and Clinical Decision Making I – PT-GE 2286 (2 Cred.)
- Principles of Exercise – PTGE.2227 (2 Cred.)

New York University (2014 – 2018):

- Critical Inquiry and Clinical Decision Making II – PT-GE 2287 (2 Cred.)

University of Washington (2009 – 2014)

- Therapeutic exercise REHAB 508 (Summer '12, Summer '11, Summer '10) [Instructor]
- Patient Evaluation and Clinical Decision Making REHAB 536 (Spring '14, Spring '12, Spring '09) [TA]
- Procedures II: Basic Physical Examination of the Spine REHAB 506 (Winter '13) [TA]
- Physical Therapy Seminar REHAB 517 (Winter '13, Fall '12) [TA]
- Neuroscience for Rehabilitation Professionals REHAB 551 (Winter '12, Winter '10, Winter '09) [Teaching Lab Assistant, guest lectures]
- Functional Anatomy of the Spine, Trunk, Abdomen & Pelvis REHAB 545 (Winter '12) [Teaching Lab Assistant including full responsibility for some of the labs]
- Functional Anatomy of the Upper & Lower Extremities REHAB 544 (Fall '11) [Teaching Lab Assistant including full responsibility for some of the labs]
- Applied Neurology REHAB 523 (Fall '09) [TA]
- Physical Therapy Procedures: Functional Skills Assessment REHAB 509 (Fall '09) [TA]
- Functional Mobility Skills REHAB 537 (Summer '09) [TA]

WORK EXPERIENCE:

- 10/07-09/08 Aerobics and Core conditioning instructor at the Pro Sports Club (Bellevue), and All Star Fitness (Seattle).
- 10/04-05/07 Physical Therapist at "Meuhedet Sport"- The sports clinic of HMO Meuhedet.
- 08/06-05/07 Physical Therapist of the Israeli Handball Premier League team "Asa Tel Aviv".
- 05/05-05/07 Physical Therapist and Advisor at "APOS"- medical and sports technologies Ltd.

- 03/99-07/07 Aerobics, Conditioning and Fit-Ball Instructor in the following studios: Studio B (Tel Aviv), Great Shape (Tel Aviv, Herzliya), Tel Aviv University Sports-center.
- 12/01-07/06 Coordinator of Aerobics and Conditioning Certification Program, Wingate Institute, Israel's National Center for Physical Education and Sport.
- 09/03-05/05 Physical Therapist at "Hashla", a clinic of HMO "Maccabi Health Services".
- 05/05-07/07 Lecturer in Anatomy and Sports Injuries courses in the following institutions: The Wingate Institute (Israel's National Center for Physical Education and Sport), Tel Aviv University Sports-center, Holmes Place Academy.

PROFESSIONAL LICENSURE AND CERTIFICATES:

- 2016 Physical Therapist License (PT 040776), New York State Department of Education
- 2013 Physical Therapist License (PT 60077739), Washington State Department of Health
- 2008 Certificate program in Sports medicine and Human Performance, University of Washington Extension
- 2003 Physical Therapist License (PT 25843), Israeli Ministry of Health.
- 2000 Spinning Instructor Certificate, Mad Dog Athletic & Schwinn.
- 1999 Aerobics and Conditioning Instructor Certificate (with distinction), Wingate Institute, Israel's National Center for Physical Education and Sport.