

CURRICULUM VITAE

Didier A. Depireux, Ph.D.

Assistant Research Professor, Institute for Systems Research
University of Maryland, Electrical Engineering
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Personal Information

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Education

- **B.Sc.**, Physics, U de Liege, Belgium July 1986
Undergrad Thesis: Critical Study of the Weinberg-Salam Model
Minor in 'Computers in the problems of theoretical Physics' July 1986
High school teaching certification, U de Liege, Belgium. July 1986
- **M.Sc.**, Physics, U Maryland at College Park. Oct 1988
Thesis: A study of Anomalies in Quantum Field Theories
- **Ph.D.**, Physics, U Maryland at College Park June 1991
Thesis: Dimensional Reduction of Self-Dual Yang-Mills, Integrable Systems and W -Algebras. Thesis Advisor: Professor S.J.Gates.

Post Graduate Education

- Post-doctoral fellow, Physics, U Laval, Quebec Sep 1991-Dec 1992
- Post-doctoral fellow, Physics, U Montreal Jan 1993-Aug 1994
- Summer school, Computational Neuroscience, Woods Hole, MA Summer 1993
- Post-doct fellow, Inst for Systems Research, U Maryland, Sept 1994-Oct 1999
- Summer school, Neuromorphic Engineering, staff, Telluride, CO Summer 1998
- Asst Research Scientist, Inst for Systems Research, U Maryland Oct 1999-Aug 2001
- ASEE Fellow, Army Research Laboratory Oct 1999-Aug 2001
- Assistant Professor, U Maryland Medical School, Baltimore Sept 2001-Jun 2009
- Visiting Research Scientist, U Md College Park Sept 2001-Aug 2005
- **Adjunct, BioEngineering, U Maryland College Park Sept 2006-Present**
- **Research Scientist, Inst for Systems Research, U Maryland July 2009-Present**

Professional Memberships

- Member, Assoc for Research in Otolaryngology 1995-
- Member, American Physical Society Association 1988-

- Member, Acoustical Society of America 2000-
- Member, Society for Neuroscience 2004-

Administrative Service

Institutional Service

- School of Medicine Faculty Council 2002-2006
- School of Medicine Faculty Assembly 2003-2009
- Dpt of Anatomy & Neurobiology Space comm 2002-2003
- Dpt of Anatomy & Neurobiology Faculty Search 2004, 2005

Outside Service

- Associate editor, Cognitive Neurodynamics Journal, Springer-Verlag.
- Referee for Cerebral Cortex, J. Acoust. Soc. Amer., J. Comp. Neurosc., J. Neurophys., J. Neurosci., J. of the Franklin Institute, Nature. In my physics days, I was referee for Physics Letters B, Journal of Mathematical Physics and Europhysics Journal.
- Reviewed books for World Scientific and Oxford University Press
- NIH/BDCN F10 study section and NIH/NICHHD (ad hoc) study section
- Ad-hoc reviewer for grants from DoD's "Science and Technology Center" program, AFOSR (Air Force) YIP and the National Science Foundation (IBN – Sensory systems).
- Evaluator, Intel Science Search.
- Organized and chaired Society for Neuroscience symposium "New Perspectives on the Role of the Inferior Colliculus in Sensory Coding", Nov 2008

Teaching Responsibilities

- Medical students: Structure and Development (head and neck section)
- Medical students: Neuroscience (auditory, vestibular, thalamus)
- Course Master for "Biological Signal Analysis" (NACS 615)
- Lectures for "Introduction to Neuroscience" (NACS 641)
- Lectures for "Recording Neural Activity" course (NACS 778)
- Lectures for "Modern Neuroanatomical Methods" course (NACS 777)
- "Readings in Neuroscience" with A.Keller (Spring 05) within NACS 637 framework.
- Leads discussion for "Ethics", an annual course for graduate students.

Grant Support (with direct costs, since 2002)

- PI, grant R01 DC05937-01, "Encoding of Dynamic Spectrum in Auditory Cortex", \$1,125,000, 06/01/2002 - 05/31/2008
- PI, Bressler Research Grant, "Representation of timbre in the awake ferret Inferior Colliculus", 02/01/2005 - 01/31/2006, \$15,000
- PI, American Tinnitus Association, "Targeting the changes in Inferior Colliculus induced by tinnitus" 07/01/2007 – 06/31/2008, \$50,000
- PI, Congressionally Directed Medical Research Program, "Targeting and Reducing Noise Trauma-Induced Tinnitus and Hearing Loss", 07/01/2009 – 06/31/2012, \$450,000
- Several grants are pending review, consultant on several grants.

Publications

Journal Articles (Peer Reviewed)

- HD Dobbins, P. Marvit, B. Shechter, DA. **Depireux** *Spectro-Temporal Tuning during Feature Transients in Primary Auditory Cortex of the Awake Ferret*, submitted, J Neurophys.
- P.Marvit, H.Dobbins, B.Shechter and DA **Depireux** *Spectro-temporal receptive field characterization with dynamic ripples in the awake ferret inferior colliculus*, under review J.Neurophys.
- P.Marvit, B.Shechter, H.Dobbins and DA **Depireux**, *The effect of level and contrast on spectrotemporal receptive fields in inferior colliculus in the awake ferret*, in preparation.
- 33. R.Hertzano, C.Puligilla, SL.Chan, C.Timothy, DA.**Depireux**, J.Wolf, Z.Ahmed, TB. Friedman, S.Riazuddin, MW.Kelley, SE.Strome, *CD44 is a marker for the outer pillar cell in the early post-natal mouse inner ear*, accepted, JARO
- 32. B.Shechter, P.Marvit, **DA Depireux**, *Lagged and non-lagged cells in the inferior colliculus of the ferret*, Eur J. Neurosc 31(1) (2010) 42-8
- 31. MH Bae, GB Bissonette; WM Mars; GK Michalopoulos, CL Achim, **DA Depireux**, EM Powell, *Hepatocyte growth factor (HGF) modulates GABAergic inhibition and seizure susceptibility*, Experimental Neurology 221 (2010) 129-135
- 30. B.Shechter, DA **Depireux**, *Nonlinearity of Coding in Primary Auditory Cortex of the Awake Ferret*, Neuroscience 165(2) (2010) 612-20
- 29. B.Shechter, HD.Dobbins, P Marvit, DA **Depireux**, *Dynamics of Spectro-Temporal Tuning in Primary Auditory Cortex*, Hear Res. 256 (1-2) (2009) 118-30.
- 28. M.Osmanski, DA **Depireux**, P.Marvit, R.Dooling, *Discrimination of auditory gratings (ripples) in birds*, Hear Res. 256 (1-2) (2009) 11-20
- 27. B.Shechter, DA **Depireux**, *Stability of Spectro-Temporal Tuning over Several Seconds in Primary Auditory Cortex of the Awake Ferret*, Neuroscience, 148 (3) (2007) 806-14
- 26. S.Kalluri, DA **Depireux**, S.A.Shamma, *Perception and cortical neural coding of harmonic fusion in ferrets*, J.Acoust.Soc.Am, 123(5) (2008) 2701-16.
- 25. HD.Dobbins, P.Marvit, Y.Ji, DA **Depireux** *Chronically recording with a multi-electrode array device in the auditory cortex of an awake ferret*, J Neurosci Meth 161(1) (2007) 101-11
- 24. B.Shechter and DA **Depireux**, *Response Adaptation to Broadband Sounds in Primary Auditory Cortex of the Awake Ferret*, Hear Res. (2006) 221(1-2):91-103.
- 23. J.Z.Simon, DA **Depireux**, D.J.Klein and S.A.Shamma, *Temporal Symmetry in Primary Auditory Cortex: Implications for Cortical Connectivity*, Neural Computation 19 (3) (2007) 581-638.
- 22. J.Z.Simon, D.J.Klein, S.A.Shamma and DA **Depireux**, *Stimulus-invariant processing and spectrotemporal reverse correlation in primary auditory cortex.*, J. Comput.Neurosci, 2006; 20(2), 111-136
- 21. Jones LM, **Depireux** DA, Simons DJ, Keller A., *Robust temporal coding in the trigeminal system*. Science. 2004 Jun 25;304(5679):1986-9.
- 20. DA **Depireux**, J.Z.Simon, D.J.Klein and S.A.Shamma, *Spectro-temporal response field characterization with dynamic ripples in ferret primary auditory cortex*, J Neurophysiol. 2001 Mar;85(3):1220-34.
- 19. D.J.Klein, DA **Depireux**, J.Z.Simon and S.A.Shamma, *Robust Spectrotemporal Research Correlation for the Auditory System: Optimizing Stimulus Design*. Journal of Computational Neuroscience, 9 (2000) 85-111.
- 18. DA **Depireux**, J.Z.Simon and S.A.Shamma, *Measuring the dynamics of neural responses*

in *2primary auditory cortex* Comments in Theoretical Biology 5(2) (1998) 89-118.

17. N.Kowalski, DA **Depireux** and S.A.Shamma, *Analysis of Dynamic Spectra in Ferret Primary Auditory Cortex: I. Characteristics of single unit responses to moving ripple spectra*, Journal of Neurophysiology 76 (5) (1996) 3503-3523.

16. N.Kowalski, DA **Depireux** and S.A.Shamma, *Analysis of Dynamic Spectra in Ferret Primary Auditory Cortex: II. Prediction of Unit Responses to Arbitrary Dynamic Spectra*, Journal of Neurophysiology 76 (5) (1996) 3524-3534.

----- the following publications are in theoretical physics -----

15. DA **Depireux** and J.Schiff, *The many faces of the KP hierarchy*, Lett.Math.Phys. 33 (1995) 99-111.

14. DA **Depireux** and P.Mathieu, *Integrable Supersymmetry Breaking Perturbations of $N=1,2$ Superconformal Minimal Models*, Phys.Lett. B308 (1993) 272-278.

13. DA **Depireux**, *A Note on the KP Hierarchy*, Mod. Phys. Lett. A7 (1992) 1825-1834.

12. DA **Depireux** and P.Mathieu, *On the Classical $WN(l)$ Algebras*, Int. J. Mod. Phys. A7 (1992) 6053-6080.

11. I.Bakas and DA **Depireux**, *The Origin of Gauge Symmetries in Integrable Systems of KdV Type*, Int. J. Mod. Phys. A7 (1992) 1767-1792.

10. DA **Depireux**, *Dimensional Reduction of Self-Dual Yang-Mills, Integrable Systems and W Algebras*,

UMI-92-05052-mc (microfiche), 1991, 110pp, Ph.D.Thesis.

9. I.Bakas and DA **Depireux**, *A Fractional KdV Hierarchy*, Mod. Phys. Lett. A6 (1991) 1561-1574.

8. I.Bakas and DA **Depireux**, *Self-Duality and Generalized KdV Flows*, Mod. Phys. Lett. A6 (1991), 399-408.

7. DA **Depireux**, *Fermionic Realization of W_{1+1}* ; Phys. Lett. 252B (1990) 586-590.

6. S.Bellucci, DA **Depireux** and S.J. Gates, Jr., *Universal Inclusion of the Lorentz Chern-Simons Form in $D = 10, N = 1$ Supergravity Theories*, Phys. Lett. 238B (1990) 315-322.

5. DA **Depireux**, S.J.Gates, Jr., and B. Radak, *Yes, Leftons for Heterotic Superstrings*, Phys. Lett. 236B (1990) 411-416.

4. DA **Depireux**, S.J.Gates, Jr., P.Majumdar, B.Radak and S.Vashakidze, *Towards covariantly quantized $D = 10$ type II Green-Schwarz α -Models*, Nucl. Phys. B344 (1990) 165-195.

3. DA **Depireux**, S.J.Gates, Jr., and S.Vashakidze, *Algebra of the Local Symmetries for the $D=4, N=1$ Green-Schwarz Superstring*, preprint # UMDEPP-89-171 (1989) 10pp.

2. DA **Depireux**, S.J.Gates, Jr., and S.Bellucci, *$(1,0)$ Thirring Models and the Coupling of Spin-0 Fields to Heterotic Strings*, Phys. Lett. 232B (1989) 67-74.

1. DA **Depireux**, S.J. Gates, Jr. and Q-H. Park, *Lefton-Righton Formulation of Massless Thirring Models*, Phys. Lett. 224B (1989) 364-372.

Contributions to refereed Conferences

9 DA **Depireux**, B.Shechter, HD. Dobbins, *On the dynamics of Spectro-Temporal Tuning in Auditory Cortex*, Proceedings of the International Conference on Cognitive Neurodynamics 2007, Wang, Gu and Shen Eds, Springer

8. N.A. Kanlis, S.A. Shamma, J.Z. Simon, DA **Depireux**, *Realistic Model on the Blind Separation of Convolved Information Sources*, 2003 International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences, Las Vegas, NV, 2003.

7. DA **Depireux**, *Vehicle Classification Using a Biological Model of Hearing*, Military Sensing Symposia on Battlefield Acoustics and Seismics, 2000. (classified proceedings)

6. S.A.Shamma, D.J.Klein and DA **Depireux**, *On the role of Coincidence in Pitch Perception and the*

Formation of Harmonic Templates in the Early Auditory System, in *Physiological and Psychophysical Bases of Auditory Function*, Shaker publishing BV, 2001.

5. DA **Depireux**, S.Varma, J.Baras, N.Srour and T.Pham *Vehicle Classification Using Acoustic Data Based on Biology Hearing Models and Multiscale Vector Quantization*, in *Federated Lab00*, College Park, MD, 2000.

4. S.A.Shamma, DA **Depireux**, C.P.Brown, N.Srour and T.Pham, *Signal Processing in Battlefield Acoustic Sensor Arrays*, in *Federated Lab 99*, Washington DC, 1999.

3. DA **Depireux**, P.W. Ru, S.A. Shamma and J.Z. Simon, *Response-Field Dynamics in the Auditory Pathway*, *Computational Neuroscience : Trends in Research*, Plenum Press, 1997

2. J.Z.Simon, DA **Depireux** and S.A.Shamma, *Representation of complex spectra in auditory cortex*, in *Psychological and Physiological advances in Hearing*, Whurr publishers, 1998, 513-520.

1. S.A.Shamma , DA **Depireux** and C.P.Brown, *Signal Processing in Battlefield Acoustic Sensor Arrays*, 6th Battlefield Acoustic Symposium (classified proceedings).

Non-refereed Contributions

- DA **Depireux**, *La Stereovision*, Bulletin N334 Science et Culture, March 1995, 13pp.

- DA **Depireux** and J.Schiff, *On the Hamiltonian Structures and the Reductions of the KP hierarchy*, Proceedings of the NSERC-CAP Workshop on Quantum Groups, Integrable Models and Statistical Systems, Kingston, Canada, Jul 13-17, 1992, 8pp.

- DA **Depireux** and I. Bakas, *Self-duality, KdV Flows and W-algebras*, proceedings of the XXth Int. Conf. on Differential Geometric Methods in Theoretical Physics, New York, N.Y., Jun 1991, 11pp.

Conferences (since 2005)

- Targeting and Reducing Noise Trauma-Induced Tinnitus (invited talk), 3rd Tinnitus Research Initiative Meeting, Stresa Italy, June 09 (DA Depireux, EM.Powell, B.Shechter)

- CD44 Expression in the Mouse Inner Ear, Assoc for Res in Otolaryngology, Baltimore MD, Feb 09, (R.Hertzano; J.Babus; C.Puligilla; R.Elkon; M.Irmler; D.Depireux; Z.Ahmed; S.Riazuddin; TB. Friedman; MW. Kelley; J Beckers; KB. Avraham; SE. Strome)

- Involvement of the Inferior Colliculus in tinnitus, Society for Neuroscience, Washington DC Nov 2008, (D.Depireux, Y.Ji, B.Shechter, E.Powell), **symposium** organizer and poster.

- Response Complexity and the Encoding of Stimulus Contrast in AI of the Awake Ferret, Society for Neuroscience, Washington DC Nov 2008, (B.Shechter, Y.Ji and D.Depireux)

- Initial identification and characterization of immune system associated proteins in the mouse inner ear, Assoc for Res in Otolaryngology, Phoenix AZ, Feb 08, (R Hertzano, Babus, DA Depireux, ..., S Strome)

- Changes in Inferior Colliculus Activity of the Rat Related to Tinnitus, Association for Research in Otolaryngology, Phoenix AZ, Feb 08, (DA. Depireux, Y Ji, EM. Powell, B Shechter)

- Non-linear Effects and Nonlinear Coding Schemes in Primary Auditory Cortex of the Awake Ferret, Association for Research in Otolaryngology, Phoenix AZ, Feb 08, (B Shechter, DA Depireux)

- On the dynamics of Spectro-Temporal Tuning in Auditory Cortex, (invited) International Conference on Cognitive Neurodynamics, Shanghai, China, Nov 07 (DA Depireux, HD. Dobbins, and B Shechter)

- Alterations in GABAergic cortical circuitry alter cognition, Society for Neuroscience 2007, San Diego, CA, (G. Bissonette, M. Bae, T. Suresh, G. Schoenbaum, D. Depireux, E. M. Powell)

- Hepatocyte growth factor (HGF) reduces seizures and behavioral deficits in a mouse model of frontal lobe epilepsy, American Epilepsy Society, Philadelphia, PA, Dec 07 (M Bae, G Bissonette, T Suresh, T Franz, DA. Depireux, and EM. Powell)

- Changes in Inferior Colliculus Activity of the Rat Induced by Tinnitus, Advances in tinnitus assessment, treatment and neuroscience basis, Grand Island, NY, Jun 2007, (DA. Depireux, EM. Powell, B Shechter)

- Non-classical Effects and Nonlinear Coding Schemes in Primary Auditory Cortex of the Awake Ferret, International Conference on Cognitive and Neural Systems, May 07, Boston (B Shechter, DA Depireux)
- Recording in the Awake Ferret: Midbrain and Cortex, Advances and Perspectives in Auditory Neurophysiology, Atlanta, Nov 2006 (DA. Depireux, HD.Dobbins, B.Shechter, P.Marvit)
- A Simple Extension to the STRF That Accounts for Rate-Level Non-Linearities, Assoc. for Research in Otolaryngology, Baltimore, Feb 2006 (P.Marvit, HD.Dobbins, B.Shechter, MK Afghan, D.Depireux)
- Spectro-Temporal Tuning in Long Duration Stimuli for AI of the Awake Ferret, Assoc.for Research in Otolaryngology, Baltimore, February 2006 (B.Shechter, HD.Dobbins, MK.Afghan, Y.Ji, DA.Depireux)
- Dynamics of the Spectrotemporal Representation of Broadband Stimuli in AI, Eastern Auditory Retreat, Philadelphia, July 2005 (H Dobbins, P Marvit, B Shechter, Y Ji, DA.Depireux)
- Response Modulation to Ongoing Broadband Sounds in AI, Association for Research in Otolaryngology, New Orleans, February 2005 (B.Shechter, S. Kalluri, P Marvit, HD. Dobbins, Y Ji, DA. Depireux)
- On the Spectro-Temporal Representation of Feature Onsets in AI Assoc for Research in Otolaryngology, New Orleans, February 2005 (HD. Dobbins, P Marvit, B Shechter, S Kalluri, Y Ji, DA. Depireux)
- Macroscopic Spectro-Temporal Characterization of AI Activity, Association for Research in Otolaryngology, New Orleans, February 2005 (N Kanlis, SA Shamma, JZ. Simon, DA. Depireux)
- Neuronal Response Characteristics in the Inferior Colliculus of the Awake Ferret, Association for Research in Otolaryngology, Daytona Beach, Florida, February 2005 (P Marvit, HD. Dobbins, Y Ji, B Shechter, DA. Depireux)