

**Dejenie A. Lakew, Ph.D.**

Associate Professor of Mathematics  
100 Lakeview Park Road 108  
Colonial Heights, VA 23834  
E-mail: dalemayehu@hotmail.com  
Phone: (804)520 – 1482(Home), (804)402 – 3588(Cell)  
Citizenship: **American Citizen**

Personal web site : <http://www.dejeniea.com>

Ph.D. Thesis Title: Elliptic BVPs,  $Cl_n$ -Complete Function Systems and the Clifford  $\pi$ -Operator.

Advisor: Professor John Ryan

Areas of Interest: Clifford Analysis, Partial Differential Equations and Operator Theory

Education:

- Ph.D., University of Arkansas at Fayetteville, 2000
- M.Sc., University of Alberta, Canada, 1996
- M.Sc., Addis Ababa University, Ethiopia, 1988
- B.Sc., Addis Ababa University, Ethiopia, 1984

Work Experience:

- Faculty Senate Member : 2009 – 2010
- Department curriculum and faculty search committee chairs : 2009 – 2010
- Member of the President's Academic Council at VUU: 2009 – 2010
- Interim Chair & Associate Professor of Mathematics, Virginia Union University, Jan. 2009- June 2009
  - Associate Professor of Mathematical Sciences, Virginia Union University, August 2008–May 30, 2010.
  - Assistant Professor of Mathematical Sciences , Virginia State University, August 14, 2006– May 2008.
  - Assistant Professor of Mathematical Sciences, 2000- May 2006 , University of Arkansas at Pine Bluff.
  - Graduate Teaching Assistant, 1996 – 2000, University of Arkansas, Fayetteville.
  - Graduate Teaching Assistant, 1994 – 1996 University of Alberta, Edmonton, Canada.
  - Lecturer, 1990 – 1994 Addis Ababa University, Addis Ababa, Ethiopia.
  - Assistant Lecturer and Lecturer, 1985 – 86&1988 – 90 resp Asmara University, Asmara, Eritrea.
  - Visiting Lecturer, 1987 Bahir Dar University, Bahir Dar, Ethiopia.

**Articles Written** (published and preprints):

- " The Intrinsic  $\pi$ -Operator on Domain Manifolds in  $\mathbb{C}^{n+1}$  ", *Complex Anal. Oper. Theory, Vol. 4, No. 2* (2010), pp. 271-280 ( with John Ryan )
- " The Spherical  $\pi_{\alpha, S^{n-1}}$ - Operator", *arXiv* : 0811.3257v1[math.CA] 20 Nov 2008, waiting for re-submission.
- " On Hypersingular Integral Operators over Weighted Sobolev Spaces  $W^{p,k}(\Omega, \|x\|^{\zeta+\varepsilon} dx)$ ", *arXiv* : 0908.2406v1[math.FA] 17 Aug 2009.
- " On Some Discrete Differential Equations", *arXiv* : 0805 : 1744v1[math.GM] 12 May 2008.
- " Hyper Symmetries ", *AMS(American Mathematical Society) Mathematical Imagery*.
- " Mollifiers in Clifford Analysis " , *arXiv*:0802.1539v1 [math.AP] 11 Feb. 2008 , submitted for publication.
- "  $W_{Cl_n}^{2,k}$ -Best Approximation of a  $\gamma$ -Regular Function ", *J. Appl. Anal., Vol. 13, No. 2 ( 2007 )*, pp. 259-273.
- " Complete Function Systems and Decomposition Results Arising in Clifford Analysis ", *Comp. Meth. Function Theory, CMFT, No 1(2002)*,215-228 (with John Ryan).
- " Complete Function Systems and Decomposition Results Arising in Clifford Analysis", *Progress in Analysis*, pp. 325-350, 2001 ( with John Ryan)
- " Clifford Analytic Complete Function Systems for Unbounded Domains ", *Math. Meth. Appl. Sci., Vol. 25(2002)*,1527 – 1539 (with John Ryan).
- " Best Approximation of a  $\gamma$ -regular function in certain Sobolev spaces ", *Abstracts, AMS Vol. 25 No.1 Issue 135*, pp. 80
- " Complete Func, Systems & Deco. results in Clifford Anal. " *Progress in Analysis, Proceedings of 3<sup>rd</sup> Int. ISAAC Congress*, pp. 325 – 336, Berlin, Germany, 2001.
- " Elliptic BVPs,  $Cl_{0,n}$ -Complete Function Systems and the Clifford  $\pi$ -Operator " , *Ph.D. Dissertation*, 2000, *University of Arkansas, Fayetteville*.
- " Over Determined Problems for Elliptic Equations " , *Proceedings of the 4<sup>th</sup> Int. Coll. on Differential Equations, VSP, Inter. Sci. Pub., The Netherlands*, 1994 : 11 – 20 (with Giovanni Porru).
- " On The Liapunov Inequality " , University of Alberta, Dept. of Mathematical Sciences, Canada, 1996.
- " On the  $\sum$ -Transform " ( pre-print ).
- " On the Hypercomplex  $\pi$ - Operator on the Unit Sphere and the Clifford Beltrami Equation " ( pre-print ).

**Book written:**

- " Hyper Symmetries- Mathematical Imagery " , Authorhouse 2009.

**Other Scholastic Recognitions:** My mathematical images are recognized by the American Mathematical Society and selected to be on:

- Mathematical Imagery section of the AMS web site
- 2009 AMS Imagery Calendar-one image
- 2010 AMS Imagery Calendar-one image

**Work on progress:**

- On  $\Psi$ DOs ( the ones which are Singular Integral Operators (**SIOs**) and the ones which are actual Ordinary or Partial Differential Operators.
- On fixed and moving points of the Clifford  $\pi$ -operator in  $\mathcal{L}^2(\Omega, Cl_n(\mathbb{C}))$
- In the generalized Hilbert space  $W^{2,k}(\Omega, Cl_n)$ , we know that:

$$\pi_\Omega : W^{2,k}(\Omega, Cl_n) \rightarrow W^{2,k}(\Omega, Cl_n)$$

preserves regularity and it also preserves norm that it is an isometry. But for given  $\phi, \psi \in W^{2,k}(\Omega, Cl_n)$ , does  $\pi_\Omega \phi = \psi$  have a meaning?

Where exactly is the equation valid and solvable for  $\phi$ , if  $\psi$  is given? We try to find a section (or sub space) of validity in  $W^{2,k}(\Omega, Cl_n)$  to the question.

Also what are the conditions on the component functions  $\phi, \psi \in W^{2,k}(\Omega, Cl_n)$  so that the *triangle inequality* on the squared norm defined as

$$||| \bullet ||| := \| \bullet \|^2$$

is actually an *equality*: i.e.

$$\begin{aligned} & | \quad \| \phi + \psi \| = \| \phi + \psi \|_{W^{2,k}(\Omega, Cl_n)}^2 \\ & = \| \phi \|_{W^{2,k}(\Omega, Cl_n)}^2 + \| \psi \|_{W^{2,k}(\Omega, Cl_n)}^2 \\ & = ||| \phi ||| + ||| \psi |||? \end{aligned}$$

In general we will study and put a proposition such that under the same conditions we claim that :

$$\forall n \in \mathbb{N}, \| \phi + \psi \|_{W^{2,k}(\Omega, Cl_n)}^n = \left( \| \phi \|_{W^{2,k}(\Omega, Cl_n)}^2 + \| \psi \|_{W^{2,k}(\Omega, Cl_n)}^2 \right)^{\frac{n}{2}}$$

which is the same as equality on powers of the squared norm:

$$||| \phi + \psi |||^n = (||| \phi ||| + ||| \psi |||)^n$$

For a given  $\psi \in W^{2,k}(\Omega, Cl_n)$ , we consider the orthogonal space  $\langle \psi \rangle^\perp$  of the space  $\langle \psi \rangle$  generated by  $\psi$  with respect to the inner product in which

$W^{2,k}(\Omega, Cl_n)$  is endowed and in generalizing this, we consider the generalized Bergman space  $B^{2,k}(\Omega, Cl_n)$  and its orthogonal space  $(B^{2,k}(\Omega, Cl_n))^\perp$  to answer the above questions and prove the propositions.

### Professional Membership Honors and Recognitions:

- AMS : member from 1994 – 2010
- MAA : member from 1994 – 2005
- Worked as a reviewer for the Journal, *Boundary Value Problems* 2009, Hindawi Publishers.
- John C. Massie Fellowship for Summer 2000 (Doctoral scholarship), University of Arkansas, Fayetteville.
- Teaching Assistantship : University of Arkansas ( 1996–2000) , University of Alberta, Edmonton, Canada (1994 – 1996)
- **Marquis Who's Who in the World** , to appear in 2010 edition.
- **Cambridge Who's Who, 2009**
- **Marquis Who's Who in Science & Engineering** 2006 – 2007(9<sup>th</sup>) Edition.
- **Marquis Who's Who in America** 58<sup>th</sup>, 60<sup>th</sup> , 61<sup>st</sup> **Editions and ( 62<sup>nd</sup> ed. to appear)**
- **Wall of Tolerance Honoree**

### Presentations:

- 1022<sup>nd</sup> AMS Special Session on "*Dirac Operators in Analysis and Geometry*", Nov. 3 – 4, 2006, University of Arkansas, Fayetteville : "*The Intrinsic  $\pi$ -Operator On Domain Manifolds*"
- AMS Joint Mathematics Meeting, Jan. 7 – 10, 2004, Phoenix Arizona : "*Best Approximation of a  $\gamma$ -Monogenic Function Over Certain Sobolev Spaces*"
- 63<sup>rd</sup> Annual Meeting of the MAA of Oklahoma-Arkansas Section, March 30 – 31, 2001 : " *$L^p$ -Approximations*"
- 62<sup>nd</sup> Annual Meeting of the MAA of Oklahoma-Arkansas Section, March 31-April 1, 2000 : "*Elliptic BVPs and  $Cl_{0,n}$ -complete function systems*"
- Departmental Seminar on my Thesis at the UAF : "*First and Higher order BVPs and Clifford Analytic Complete Function Systems in the Bergman Spaces :  $B_{Cl_{0,n}}^p(\Omega)$  and  $B_{Cl_{0,n}}^l(\Omega)$* ".
- 61<sup>st</sup> Annual Meeting of the MAA of Oklahoma-Arkansas Section, March 26 – 27, 1999 : " *$Cl_{0,n}$ -Complete Function Systems Over Unbounded Lipschitz Domains in  $\mathbb{R}^n$* ".
- Departmental colloquium presentation at VSU, Oct. 2006: "*Finite  $Cl_n$ - Minimal Functions to Approximate a  $\gamma$ - Regular Function*".

### Courses Taught:

**Virginia Union University:( 2008-Present)**

College Algebra  
College Trigonometry  
Calculus for Business I  
Intro. to Statistics  
Mathematics for Business  
Calculus I  
Discrete Mathematics  
Differential Equations  
Advising independent study

**Virginia State University:(2006-2008)**

Basic Mathematics  
Calculus I  
College Algebra and Trigonometry  
Trigonometry  
Finite Mathematics.

**University of Arkansas at Pine Bluff:(2000-2006)**

College Algebra  
Trigonometry  
Calculus II  
Calculus III  
Linear Algebra  
Abstract/Modern Algebra I  
Abstract/Modern Algebra II  
Discrete Mathematics  
Differential Equations and Mathematical Modeling I  
Differential Equations & Mathematical Modeling II

**University of Alberta, Canada:** Calculus and Lab courses, Tutored undergraduate math courses.

**Addis Ababa University, Ethiopia:**

Elementary Calculus  
Calculus II  
Calculus III  
Linear Algebra  
Fundamental Concepts of Abstract Algebra  
Complex Variables  
Introduction to Real Analysis

**Hobbies:**

Aside from teaching and research in mathematics, it gives me a great pleasure to discuss with people about the beauty of mathematics, its capabilities in

providing multitudes of possibilities and opportunities for mankind to think, ponder and discover:

*Mathematics forces us to change how we think as technology does how we live.*

I also like to share good times with my family, playing keyboard, chess, soccer and swimming (whenever a pool is available) and watching television about the political system of America and learn how the political system is the basis for the overall development of the country, which I prescribe to other politically troubled societies to learn from.