



## Curriculum Vitae

### **Emil Daniel Schwab**

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#### **EDUCATION:**

- **Ph.D.** in Mathematics, University "Babes-Bolyai" of Cluj-Napoca" , Romania. Thesis Title: "Contribution to the Study of Multiplicativity and Additivity in Incidence Algebras"(communicated on Sept. 13<sup>th</sup>, 1995).
  - **Licentiate** in Mathematics, West University of Timisoara , Romania. Thesis Title: "Inverses in Special Categories" (June 1987).
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#### **APPOINTMENTS:**

##### **- Academic:**

**09/2007 –** *Associate Professor*, UTEP, Dept. of Mathematical Sciences  
**09/2001 – 08/2007** *Assistant Professor*, UTEP, Dept. of Mathematical Sciences  
**09/1996 – 08/2001** *Associate Professor*, Univ. of Oradea, Ro, Dept. of Math.  
**09/1990 – 08/1996** *Assistant Professor*, Univ. of Oradea, Ro, Dept. of Math.  
**09/1987 – 08/1990** *Instructor*, Pedagogical College "I. Vulcan", Oradea, Ro

##### **- Administrative:**

**09/1996-08/1998** *Assistant Dean*, College of Sciences, Univ. of Oradea, Ro  
*Vice-Chairman*, Dept. of Mathematics, Univ. of Oradea, Ro  
*Managing Editor*, "Annals of University of Oradea" - Math.  
**09/1991–08/1992** *Vice-Chairman* of the Board of the Mathematics Association  
"Olympus SNC", Romania

## TEACHING:

- Undergraduate Courses: Abstract Algebra, Linear Algebra, Elementary Number Theory, Geometry, Discrete Mathematics, Applied Math. for Engineers, Applied Math. for Business, Mathematics Education.
  - Graduate Courses: Special Topics in Algebra, Number Theory, Combinatorics
  - Graduate Theses Directed: 20 Theses for MS and/or MAT in Math
  - Other: Program Director for the Calculus Supplemental Instruction.  
Program Director for the UTEP-EPCC Cooperative Project.  
Coordinator for recruiting and training PLTL and SI leaders.  
Workshop organizer.
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## GRANTS:

- *Cross Institutional Implementation of Supplemental Instruction- UTEP-EPCC Cooperative Project*, U.S. Dept. of Education , P120A050046, (10/01/2008 – 09/30/2011) \$ 599,445
  - *Modular Development and Supplemental Instruction (SI) for the Calculus Course taken by all STEM Majors*, U.S. Dept. of Education, P120A050046, (10/01/2005 – 09/30/2008), \$ 299,783
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## RESEARCH:

- **Research Interest:**

Number Theory – Arithmetical Functions

Algebraic Structures – Inverse Semigroups and Division Categories

Algebraic Combinatorics – Möbius Function and Möbius Categories

Mathematics Education – Problems Solving and Heuristic Strategies

- **Publications and Talks:**

3 books,

50 papers.

53 presentations and talks in: USA, Romania, Hungary, Italy, Greece, Slovakia

- **Other:**

Reviewer for Math. Reviews, Referee for several math. journals, invited speaker and member of the Organizing Committee of several National and International Conferences.

## PUBLICATIONS:

- **Text-Books**

*Problems in Finite Group Theory*, (with G.Silberberg)  
Scholarly, Tempe, Arizona, Jan. **2003**, 90 pgs.

*Algebraic Structures. Modules. Homological Methods*,(with E.H.Schwab)  
Crican, Romania , **1997**, 201 pgs

*Algebraic Structures. Rings*,  
Multiprint , Romania, **1994**, 103 pgs.

- **Lecture Notes**

*Möbius Categories and Combinatorial Inverse Monoids*,  
[http://www.math.utep.edu/forgrads/lecture\\_notes/](http://www.math.utep.edu/forgrads/lecture_notes/), **2006**, 120 pgs.

- **Papers**

*On incidence algebras of combinatorial inverse monoids*,  
Communications in Algebra (accepted for publication on April, **2009**)

*The Möbius category of a combinatorial inverse monoid with zero*,  
Annales des Sciences Mathematique du Quebec  
(accepted for publication on June, **2009**)

*A Dirichlet analogue of the free monogenic inverse semigroup via Möbius inversion*,  
(with George Stoianov-graduate student)  
Rocky Mountain Journal of Math (accepted for publication on January, **2009**)

*A partial order on bipartite graphs with  $n$  vertices*,  
Annals. Computer Science Series, Tibiscus Univ., Vol.7, No.1, **2009**, 315-324.

*Pseudo-Linear Approximation and Applications to Image Processing*,  
(with B. Bede, H. Nobuhara & I.J. Rudas)  
Int. Journal of Approx. Reasoning, vol.50, **2009**, 21-36

*A unique factorization in commutative Möbius monoids*,  
(with P. Haukkanen)  
Int. Journal of Number Theory Vol 4, No 4, **2008**, 549-561

*The Möbius Category of a Semilattice of Groups,*  
Italian Journal of Pure and Appl. Math. , vol. 24, **2008**, 121-134

*Strictly Increasing Sequences of Integers and the Möbius Inversion Formula*  
JP J. of Algebra, Number Th.& Appl., Vol 11, No 1, **2008**, 59-65

*Inner Separation Structures for Topological Spaces*  
(with O. Mendez & L. Popescu)  
Balcan Journal of Geometry and its Appl., Vol 13, No 2, **2008**, 59-65

*Multichannel Image Decomposition by Using Pseudo-Linear Harr Wavelets*  
(with B. Bede & H. Nobuhara)  
Proceeding of 2007 IEEE International Conference on Image Processing  
San Antonio, **2007**, IV17-IV20. (with referees)

*On the Combinatorial Inverse Monoid  $IO_3$ ,*  
(with Efren Romero-graduate student)  
Annals of Tibiscus Univ, Comp. Sci. Series, Vol 4<sup>th</sup> , Tome 1, **2006**, 213-227  
(Proceeding of European Conference on Computer Sciences & Applications,  
Timisoara, 2006)

*Characterizations of some class of formal power series via Möbius categories of full binomial type,*  
ArXiv:math.CO/0501271 v1 18 Jan **2005** (preprint without referees)

*Abstract Möbius-Division Categories are Reduced Standard Division Categories of Combinatorial Inverse Monoids,*  
(with Efren Romero-graduate student)  
Annals of Tibiscus Univ, Comp. Sci. Series, Vol 3, Tome 1, **2005**, 21-29

*Möbius Categories as Reduced Standard Division Categories of Combinatorial Inverse Monoids,*  
Semigroup Forum, Springer-Verlag New York, Vol 69, **2004**, 30-40.

*The Möbius Category of some Combinatorial Inverse Semigroups,*  
Semigroup Forum, Springer-Verlag New York, Vol 69, **2004**, 41-50.

*Characterizations of Lambeck-Carlitz Type,*  
Archivum Mathematicum, Tomus 40, **2004**, 1-6

*On Triangular Categories,*  
Houston Journal of Mathematics, Volume 29, No 1, **2003**, 25-40.

*The Inverse Baer\*-Category of a Chain,*  
(with E.H.Schwab)  
Radovi Matematicki, Sarajevo, Vol.11, **2002**, 1-5.

*Pullbacks and Pushouts in Triangular Categories,*  
(with E.H.Schwab)  
Proceedings of the Algebra Symposium, "Babes-Bolyai" University of Cluj-Napoca  
**2002**, 253-260.

*The Valuated Ring of the Arithmetical Functions as a Power Series Ring,*  
(with G. Silberberg)  
Archivum Mathematicum, Tom. 37, #1, **2001**, 77-80.

*A Note on Some Discrete Valuation Rings of Arithmetical Functions,*  
(with G.Silberberg)  
Archivum Mathematicum, Tom. 36, #2, **2000**, 103-109.

*Bemerkungen mit bezug auf die Anzahl der zyklischen Untergruppen von  
gegebener Ordnung im Falle einer endlichen Gruppe*  
(with G.Silberberg)  
Buletinul St.al Univ. "Politehnica" din Timisoara , Tom 44 (58), #1, **1999**, 1-6.

*Characterization of A-multiplicative Functions via the Haukkanen's Functions,*  
Journal of Natural Sciences and Mathematics, Vol.39 No.1, **1999**, 1-5.

*Über die Anzahl der zyklischen Untergruppen gegebener Ordnung im Falle einer  
endlichen Gruppe*  
(with G.Silberberg)  
Nieuw Archief voor Wiskunde- Amsterdam, (IV) 16, No.3, **1998**, 143-151.

*Complete Multiplicativity and Complete Additivity in Möbius Categories,*  
Italian Journal of Pure and Applied Mathematics, No.3, **1998**, 37-48.

*Aplicatii ale teoriei numerelor in studiul grupurilor finite (Applications of number  
theory in the study of finite groups),*  
(with G.Silberberg).  
Seminar Arghiriade Nr.28, West University of Timisoara ,(1997),

*Regular Convolutions and A-additive Arithmetical Functions,*  
Pure Mathematics and Applications, Vol.7, No. 1-2, **1996**, 183-190.

*Multiplicativite dans les categories de Möbius,*  
(with E.H.Schwab)  
Bulletins for Applied Mathematics, Budapest, July, **1996**, 147-164.

*Dirichlet Product and Completely Additive Arithmetical Functions,*  
Nieuw Archief voor Wiskunde- Amsterdam, (IV) 13, No.2, **1995**, 187-193.

*On Completely Multiplicative Incidence Functions in Triangular Categories,*  
Analele Univ. Oradea, Tom IV, **1994**, 30-32.

*On a Completely Additive Incidence Function,*  
Pure Mathematics and Applications, Vol. 5, No. 2, **1994**, 201-204.

*Asupra convolutiilor regulate (On regular Convolutions),*  
Analele Univ. Oradea 3 , (1993), 16-21.

*Multiplicative and Additive Elements in the Ring of Formal Power Series,*  
Pure Mathematics and Applications, Vol. 4, No. 3, **1993**, 339-346.

*Functii de incidenta total additive (Completely Additive Incidence Functions),*  
Analele Universitatii Oradea, No 2, (1992), 124-127.

*Definitions equivalentes de la multiplicativite dans les algebras incidents reduites,*  
Proceedings of the Conference on Algebra "Babes- Bolyai" University of Cluj-  
Napoca, 18-20 Sept. 91, **1992**, 109-114.

*Total aditivitate si convolutii discriminative(Complete Additivity and Discriminative  
Convolutions),*  
Analele Universitatii Oradea , No.1, **1991**, 143-148.

*On Some Elementary Number Theoretic Inequalities Involving the Dirichlet  
Convolution,*  
(with Laszlo Toth)  
Seminar Arghiriade Nr. 24. University of Timisoara, **1990**.

*Total Additivity and Summation Function,*  
Seminar Arghiriade Nr.25, University of Timisoara, **1990**.

*On the Equality  $\sigma ( n ) + \varphi( n ) = nd ( n )$  ,*  
R.M.T. 20 , Timisoara, **1989**, 43-45.

*Elements multiplicatifs d'une algebre incidente,*  
Seminar Arghiriade No.18, University of Timisoara, **1989**.

*Asupra functiei de sumare a unei functii aritmetice (On the Summation Function  
of an Arithmetic Function),*  
G.M. 9, Bucharest, **1989**, 321-325.

*Cyclic Subgroups of the Group of Multiplicative Arithmetic Functions*  
Proceedings of the Algebra Conference University of Brasov, **1989**, 127-132.

*Arithmetic Convolution. Applications in Combinatorics*,  
Seminar Arghiriade No.17, University of Timisoara, **1988**.

*Produsul Dirichlet al functiilor aritmetice (The Dirichlet Product of Arithmetic Functions)*,  
G.M. Metod., No.3 , Bucharest, **1988**,120-124

*Egy szamelmeleti fuggveny osszegezo fuggvenyerol, (On the Summation Function of an Arithmetic Function)*  
Matematikai Lapok 11-12, Cluj-Napoca, **1988**, 426-429.

*Produsul Dirichlet al functiilor aritmetice. Aplicatii (The Dirichlet Product of Arithmetic Functions. Applications)*,  
R.M.T. 8 (vol2) , Timisoara, **1987**, 15-19.

*Functii aritmetice multiplicative (Multiplicative Arithmetic Functions)*,  
Caiete metodico-stiintifice No.35 University of Timisoara, **1986**.

*Numere pitagoreice si inele factoriale (Pythagorean Numbers and Factorial Rings)*,  
Caiete metodico-stiintifice No.36,University of Timisoara, **1986**.

## **PRESENTATIONS/TALKS:**

### **Mathematics:**

1. *Characterizations of prime numbers using arithmetic functions*, MathFest 2009 Portland-Oregon, Aug. 6-8, 2009
2. *A partial order on bipartite graphs with  $n$  vertices*, APHS 2009, "Actual Trends and Perspectives in Hard and Soft",5-th edition, May 28-29, 2009, Tibiscus University, Romania
3. *Occurrences of Fibonacci and Thue-Morse words*, 3<sup>rd</sup> Joint NMSU/UTEP Workshop on Mathematics and Computer Science, New Mexico State University Las Cruces, April 26, 2008
4. *Coordinates pairs of Fibonacci and Thue-Morse words*, CombinaTexas Conference: Combinatorics in the South-Central U.S., University of Texas at El Paso, April 19-20, 2008
5. *Multichannel image decomposition by using pseudo-linear Haar wavelets*, 2007- IEEE International Conference on Image Processing (Special Session: soft computing in image processing, recent advances) San Antonio, Texas, Sept. 16-19, 2007
6. *On the combinatorial inverse monoid  $IO_3$* , XA 2006 European Conference on Computer Sciences & Applications, 1st edition, Timisoara, Romania, June 2<sup>nd</sup>-4<sup>th</sup>, 2006.

7. *McAlister semigroups and their application in formal languages*, Sequence of Lectures, Tibiscus University of Timisoara, Romania, June 15-22, 2005
8. *Abstract Möbius-division categories are reduced standard division categories of combinatorial inverse monoids*, International Symposium "Actual Trends and Perspectives in Hard and Soft", Tibiscus University of Timisoara, Romania, May 26-27, 2005
9. *Algebraic characterizations of exponential series*, Annual Meeting, Southwestern Section of the MAA, UTEP, El Paso, April 1-2, 2005
10. *A combinatorial research on inverse monoids via the theory of Möbius functions*, CombinaTexas Conference: Combinatorics in the South-Central U.S., Texas State University – San Marcos, February 25-26, 2005.
11. *Combinatorics on inverse semigroups*, Department of Mathematical Sciences, Colloquium, The University of Texas at El Paso, Feb. 11, 2005
12. *A characterization of prime numbers*, Annual Meeting Southwestern Section of the MAA and ArizMATYC, Northern Arizona University, Flagstaff, April 2- 3, 2004.
13. *A path through the set of numbers*, EPCC-Faculty Development Workshop El-Paso, Aug.18, 2003
14. *The Möbius category of a semilattice of finite groups*, Combinatorics 2002, Maratea (Potenza), Italy, June 2-8, 2002
15. *The Möbius function of a monomorphic and epimorphic triangular category*, CombinaTexas Conference: Combinatorics in the South-Central U.S., University of North Texas, March 29-31, 2002
16. *Monomorphic triangular categories*, Algebra Symposium "Babes-Bolyai" University of Cluj-Napoca, Romania, Nov. 23-24, 2001
17. *Möbius categories. Applications (formal power series, lattice-triangular categories, semilattice of groups)*, Colloquium-Math. Dept. University of Texas at El Paso, July 9, 2001
18. *Welcom to the world of numbers !*, Colloquium-Math. Dept. University of Texas at El Paso, March 28, 2001
19. *Characterizations of some class of formal power series*, Combina Texas conference: Combinatorics in the South-Central U.S., Texas A&M University, March 23-25, 2001
20. *On a representation of combinatorial triangular families of numbers by special Möbius categories*, Combina Texas conference: Combinatorics in the South-Central U.S., Texas A&M University, March 23-25, 2001
21. *On triangular categories II*, Research Seminar, University of Texas at El Paso, USA, Oct. 29, 1998
22. *On triangular categories I*, Research Seminar, University of Texas at El Paso, USA, Oct.22, 1998
23. *Convolutions and arithmetic functions*, PAMM's 119 Conference, Kosice Herlany, Slovakia, Oct. 23-26, 1997

24. *Arithmetic functions and regular convolutions* International Conf. of Appl. Math CAIM'97, Oradea, Romania, Oct. 17-19, 1997
25. *An embedding in the ring of formal power series*, 118-th PAMM Conference, Padova, Italy, Aug. 1997
26. *O teorema de scufundare, (An embedding theorem)* Annual Session of Scientific Communications, Univ. of Oradea, Romania, May 30-31, 1997
27. *Some properties of formal power series*, 117-th PAMM Conference, Balatonalmadi, Hungary, May 8-11, 1997
28. *On triangular categories*, Communications Session, University of Baia-Mare, Romania, Oct. 18-20, 1996
29. *Dinamici categoriale, (Categorical Dynamics)* International Congress "Actual Trends in Cybernetics and Philosophy of Science", Oradea, Ro, Oct. 17-19, 1996
30. *Calculus of fractions in special categories*, 116-th PAMM Conference, God Hungary, Oct. 10-13, 1996
31. *The incidence algebra of a triangular category and calculus of fractions*, Combinatorics'96 in honour of Giuseppe Tallini, Assisi-Perugia, Italy, Sept. 8-14, 1996
32. *On triangular categories*, 4-th Conference on Applied and Industrial Math., Chisinau (Moldova) 6-8 aug.1996- Oradea (Ro) 16-18 aug.1996
33. *Möbius categories and inverse categories*, PAMM's 114-th Conference Balatonalmadi, Hungary, 1-5 May 1996
34. *Calcul de fractii in categorii speciale (Calculus of fractions in special categories)*, Annual Session of Scientific Communications, University of Oradea, Romania, June 2-4, 1995
35. *On incidence algebra associated to a Möbius category*, 11-th Romanian National Conference of Algebra, Univ. of Constanta, Sept. 22-25 1994
36. *Categorii Möbius de tip binomial, (Möbius Categories of Binomial Type)* Annual Session of Scientific Communications, University of Oradea, Romania, May 26-28, 1994
37. *Asupra categoriilor de ordonare, (On Order Categories)* The fifth Symp. of Math. and its Appl. Research Centre of Romanian Academy and Technical University of Timisoara, Oct. 28-31, 1993
38. *Regular convolutions*, 105-th International Conference of Applied Mathematical Meetings, Univ. of Athens, Greece, Sept. 1993
39. *Möbius categories*, The 104-th PAMM-Conference, Debrecen, Hungary, July 10-14, 1993
40. *Asupra inelelor seriilor formale, (On the ring of formal power series)* Annual Session of Scientific Communications, University of Oradea, May 1993
41. *Aplicatii ale formelor biliniare extinse, (Applications of extended bilinear forms)* 10-th National Conference of Algebra, University of Timisoara, Romania, Sept. 21-23, 1992
42. *Total aditivitate (Complete Additivity)*, Annual Session of Scientific Communications, University of Oradea, Romania, May 29-30, 1992

43. *Definitii echivalente ale multiplcativitatii in algebre incidente reduce, (Equivalent Definitions of multiplicativity in reduce incidence algebras)* The 9-th National Conference of Algebra, University "Babes-Bolyai" of Cluj-Napoca, Romania, Sept. 18-20, 1991
44. *Aditivitate. Multiplicativitate in categorii Möbius (Additivity and Multiplicativity in Möbius Categories)*, The First Session of Scientific Communications Univ. of Oradea, 6-8 June 6-8, 1991
45. *Total aditivitate, (Complete Additivity)* The 8-th Romanian National Conference of Algebra, University of Iasi, October 24-27, 1990
46. *Multiplicite dans les categories de Möbius*, International Conference "Algebra and Algebraic Geometry" University of Bucharest, July 3-8, 1989
47. *Convolutie si multiplicativitate, (Convolution and Multiplicativity)*, Iasi, National Conference in Math, Romania, June 2-3, 1989
48. *Subgrupuri ciclice ale grupului functiilor aritmetice multiplicative. Aplicatii in combinatorica, (Cyclic Subgroups of the Group of Multiplicative Arithmetic Functions. Applications in Combinatorics)* Romanian National Conference of Algebra, University of Brasov, June 9-10, 1988

#### **Teaching Related:**

49. *Cross-Institutional Implementation of Supplemental Instruction*, MathFest 2009, Portland-Oregon, Aug. 6-8, 2009 (co-presenter)
50. *Peer-Led Supplemental Instruction for Calculus*, The International Sun Conference on Teaching and Learning, El Paso, February 27, 2009 (with the students: O.Marcedo and M.Fuentes)
51. *Modular Delivery and Supplemental Instruction (SI) for the Calculus Course*, 28-th Annual Conference on the First-Year Experience, Orlando-Florida, February 6-10, 2009 (with H. Knaust)
52. *Modular Delivery and Peer-Led Team-Learning for Precalculus*, AMS-MAA Joint Mathematics Meetings, Washington DC, January 5-8, 2009 (co-presenter)
53. *How to Increase the Pass Rate in Calculus Dramatically*, The International Sun Conference, UTEP, El Paso, Texas, USA, March 3-4, 2006.(with N. Marcus)