Idris Assani

Education

- Baccalaureat Serie C, Lycee Behanzin – 16 years old (Ranked first in Benin) 1971.
- MathSup-Math Spe A'(Paris- Lycee Lakanal, Lycee Hoche) –
- Admitted to the ENSI contest 1974 (never tried l'X or Ecole Normale due to incorrect information)
- Admitted to Ecole Centrale de Paris 1976.
- Bachelor of Sciences – University of Dakar 1977.
- DEA Pure Math -University of Dakar 1979.
- Doctorat 3eme cycle, Pure Math,University Paris 6,-adviser (R. Pallu de la Barriere)-Pure Math, 1981
- Bachelor, Commerce, University Paris Dauphine, 1981
- Doctorat es Sciences, Pure Math., University Paris 6, Adviser (A. Brunel) - 1986.

Professional Appointments held

- Maitre Assistant- University Paris Villetaneuse. 1981-1982
- Maitre Assistant – University -Paris 6- 1983
- Professor Ecole Nationale des Arts et Metiers –Paris - 1984-1985
- Post-Doctoral Fellow – University of Toronto – 1986-1988
- Visiting Assistant Professor – UNC- Chapel Hill – July 01 1988- July 011989
- Assistant Professor – UNC-Chapel Hill – July 01, 1989 – June 30, 1995
- Associate Professor with tenure- UNC- Chapel Hill, July 01, 1995- June 30, 1996
- Professor UNC-Chapel Hill – July 01, 1996- present.

Main Visiting appointments: Princeton, Berkeley, MSRI, IPAM, UCLA, Rice, North Texas, Luminy, Rennes, Univ. Paris 6, Strasbourg, Univ. of Maryland at College Park, Vancouver, Mac Gill, Warwick, Malaga, Sustech.

Honors and Awards

- Finalist for 2022 Board of Governors' Award for Excellence in Teaching
- Fellow of the American Mathematical Society – inaugural Class 2012
- Member American Mathematical Society selection committee, inaugural class of AMS fellows. 2012.
- Named as one of the 66 most influential mathematicians by the Royal Society since its creation in 1660. (October 15 2017 the Royal Society -celebration of MathWorlds).
- ERDOS Number: 2
- Finalist, The Benjamin Banneker award, 2006
- Teaching award: "Favorite Faculty -UNC-CH 1996.

Synergistic activities

- Organizer of yearly Chapel Hill ergodic theory workshop from 2002 to 2019 – with NSF support, and 2021, (http://ergwork.web.unc.edu) and
- Consultant expert (STEM) World Bank – ACE program (technical review, site visits, review implementation plans for now 11 existing centers of excellence in Central and West Africa (from 2013- December 2018).
- Promotion of Mathematics in Africa: Codirector (with Marcelo Viana and Stefano Luzzatto) of ICTP-NLAGA School in Dynamical Systems and Ergodic Theory, AIMS-Senegal, June 11, 2014 (M'bour, Senegal).
- Established the collaboration between UNC-Chapel Hill and Kwame Nkrumah University of Science and Technology in Ghana 2008 – 2011 that brought two KNUST undergraduate students into the Dept of Math graduate program. Both graduated with their Masters of Sciences at UNC-CH.
- Gave several one-hour lectures from April to June 2019 at Sustech in Shenzhen, China.
- Served on NSF Graduate Research Fellowship Panel in 2005, 2006, 2007 (Chair) and 2014.
- Served on the Panel Review for Howard University Mathematical Program, 2001
- Served on the Ramanujan Prize committee 2016 and 2017.
- Creation of a Mathematics Prize (approved by UNC-CH College of Arts of Science) for talented young researchers in Africa- Hosted by UNC-CH with consultation with IMU, currently initiating a method for funding- 2021

Book and Proceedings.

- *Wiener Wintner Ergodic theorems:* 228 pages, World Scientific Pub Co; 2003

- Chapel Hill Ergodic Workshops: American Mathematical Society, Contemporary Mathematics, Vol 356, 2004**.**
- Ergodic Theory and Related Fields, American Mathematical Society, Contemporary Mathematics Vol. 430, 2007.
- Ergodic Theory, American mathematical Society, Contemporary Mathematics, vol 485, 2009.
- Ergodic Theory and Dynamical Systems, Proc. Of the 2011-2012 UNC-CH ETDS workshops, DeGruyter, 276 pages, 2013.
- Ergodic Theory: Advances in Mathematics, DeGruyter, 2016.

STUDENTS

1) PhD Students

- *Katerina Nicolaou* (PhD) - "Some properties of Wiener Wintner dynamcial systems"- May 2001.
- *David Duncan* (PhD) - " A Wiener Wintner double recurrence theorem"- November 2001
- Ryo Moore (PhD) – "Extension of J. Bourgain double recurrence theorem"
- Aidan Young(PhD): -Tempero-Spatila Differentiations - May 2023

April 2016.
Current PhD Students Jacob Folks

2) Masters Students

- *Emmanuel Bonuedie,* Minimality of interval exchange transformations- 2011.
- *Carole Agyemanh Prempeh,*- Cutting and Stacking in ergodic theory- 2011.
- *Kim Noonan,* Birkhoff's theorem and the return times for the tail.- 2003.
- *Kim Presser,* "J. Bourgain's return times theorem" – 1995.
- *Leonard Choup* -"Mean Convergence of (1/N) Sum T^n f S^ng when S and T Commute, and T, S, with T S^(-1) have Finitely Many Ergodic Components" - May 2001.
- *Saric Marko*, Some ergodic properties of the expansion of the Collatz map to the 2-adic numbers. May 2020.
- *Geneva Hall,* Arnold 's Cat map ,an exposition, March 2022.
- *Ariel Glassberg :Return Times and the maximal operator -May2023*

3) Undergraduate Honors projects

- *Tom Peng* - "The central limit theorem" -1998 (Highest honors)
- *Elaina Blanks* - "Continuous Nowhere differentiable functions- 2000 (honors).
- *Ben Dodson* - " R. C. Vaughan's proof of the Bombieri-Vinogradov theorem"-2005 (Highest Honors)
- *Megan Somerday- "On Littlewood conjecture" . April 2006 - Honors*
- *Erica Zuhr. **Henderson Prize**- "On the Besicovich set". April 2007- Honors*
- *Chase Debnam: April 2010- Honors*
- *Sean, McMahon "On a property of A. Brunel's operator" 2016.*
- *David Cavender" Generalizing the Peano Curve". April 2018. Honors.*
- *Lyon, Lukas, On Douglas Hofstadter's 1979 book "G¨ odel, Escher, Bach: An Eternal Golden Braid". 2018.*
- *Hunter Davis, "Elements of the Mathematic", Two interesting examples at the intersection of math. May 2021. Honors.*
- *Scott Hallyburton-**BRAUER Prize-** Properties of Brunel's operator -Highest Honors May 2022*
- *Cooper Schoone - Properties of Brunel's operator- Highest Honors-May 2022*
- *Anand Hande; Syracuse Maps as a non-singular power bounded tranformatios , and the inverse map- March 2023- Highest Honors- BRAUER Prize*
- ***Students currently advised:** Ethan Ebbighausen*

Publications:

- Parties décomposables compactes de L_{1E}. (with Klei, Heinz-Albrecht (French) [Decomposable compact subsets of L_{1E}] *C. R. Acad. Sci. Paris Sér. I Math.* **294** (1982), no. 16, 533–536.
- Quelques résultats liés aux ensembles décomposables de L_{1E}. (French) [Some results concerning decomposable sets of L_{1E}] *C. R. Acad. Sci. Paris Sér. I Math.* **294** (1982), no. 19, 641–644.
- Une caractérisation des Banach réticulés faiblement séquentiellement complets. (French) [A characterization of weakly sequentially complete Banach lattices] *C. R. Acad. Sci. Paris Sér. I Math.* 298 (1984), no. 18, 445–448.
- Sur la convergence ponctuelle de $T_n f/n_\alpha$, dans L_p. (with Mesiar, Radko)(French) [Pointwise convergence of $T_n f/n_\alpha$ in L_p] *Ann. Sci. Univ. Clermont-Ferrand II Probab. Appl.* No. 3 (1985), 21–29.
- Quelques résultats sur les opérateurs positifs à moyennes bornées dans L_p. (French) [Some results on L_p mean bounded positive operators] *Ann. Sci. Univ. Clermont-Ferrand II Probab. Appl.* No. 3 (1985), 65–72.

- Sur une propriété borélienne des suites relativement faiblement complètes dans un espace de Banach. (French) [A Borel property of weakly complete sequences in a Banach space] *C. R. Acad. Sci. Paris Sér. I Math.* 301 (1985), no. 14, 691–694.
- On the a.e. convergence of $T_n f/a_n$ in L_1-space.(with Mesiar, Radko) Proceedings of the 13th winter school on abstract analysis (Srní, 1985). *Rend. Circ. Mat. Palermo (2) Suppl.* No. 10 (1985), 57–61 (1986).
- On the punctual and local ergodic theorem for nonpositive power bounded operators in L_pc$[0,1]$,$1<p<+\infty$. *Proc. Amer. Math. Soc.* 96 (1986), no. 2, 306–310.
- Sur les opérateurs à puissances bornées et le théorème ergodique ponctuel dans $L_p[0,1]$, $1<p<+\infty$. (French) [Operators with bounded powers and the pointwise ergodic theorem in $L_p[0,1]$, $1<p<+\infty$] *Canad. J. Math.* 38 (1986), no. 4, 937–946.
- Quelques propriétés mesurables de diverses suites d'un espace de Banach séparable E dans $E^{\mathbf{N}}$. (French) [Some measurable properties of various sequences of a separable Banach space E in $E^{\mathbf{N}}$] *Math. Scand.* 58 (1986), no. 2, 301–310.
- On the loss of information in the transition from deterministic systems to probabilistic processes.(with Courbage, M.) *Lett. Math. Phys.* 12 (1986), no. 4, 257–265.
- Sur la convergence ponctuelle de quelques suites d'opérateurs. (French) [On the pointwise convergence of some operator sequences] *Canad. Math. Bull.* 30 (1987), no. 2, 134–141.
- Quelques théorèmes ergodiques dans les espaces L_{pE}. (French) [Some ergodic theorems in L_{pE}-spaces] *Ann. Inst. H. Poincaré Probab. Statist.* 23 (1987), no. 2, 209–224.
- Estimates of positive linear operators on L_p.
Proc. Amer. Math. Soc. 104 (1988), no. 1, 193–196.
- Alternating procedures in uniformly smooth Banach spaces.
Proc. Amer. Math. Soc. 104 (1988), no. 4, 1131–1133.
- Rota's alternating procedure with nonpositive operators.
Adv. Math. 77 (1989), no. 2, 183–188.
- Minimal-Convergence-on-Lp-spaces,
Ergodic Theory and Dynamical Systems ,10, 411-421, 1990.
- An equivalent measure for some nonsingular transformations and applications, *Studia Mathematica, 97*, 1-12, 1990 (with J.Wos).
- The helical trasnform as a connection between ergodic theory and harmonic analysis *Trans of the Amer. Math. Soc.,* vol 331, 1,p.131-142, 1992 (with K. Petersen).
- Some-connections-between-ergodic-theory-and-harmonic-analysis
Proc. of the Int. Conf. in Prob. and Erg. Th. . Evanston, Illinois, 1991(with K. Petersen and H. White).
- Universal weights from dynamical systems to mean bounded positive operators *Proc. of the Int. Conf. in Prob. and Erg. Th. Evanston, Illinois,* 1991.
- A-Wiener-Wintner-property-for-the-helical-transform"
Erg. Th. and Dyn. Sys., 12, 185-194,1992.
- The Wiener-Wintner property for the helical transform of the shift on [0,1]Z, *Erg. Th. and Dyn. Systems 12*, 659-672, 1992.
- The return times and the Wiener Wintner property for Mean bounded positive operators, *Erg. Th. and Dyn. Systems 12*, 1-12, 1992.

- The helical transform and the a.e. convergence of Fourier Series, *Illinois Journal of mathematics, vol 37*, 1, 123-147, 1993.
- Uniform Wiener-Wintner Theorems for weakly mixing dynamical systems (preprint 1993- unpublished-available).
- Wiener Wintner return times ergodic theorem, *Israel J. of Math, 92*, p.375-395, 1995 (with E. Lesigne and D. Rudolph).
- Strong laws for weighted sums of iid random variables, *Duke Math. J.*, vol 88, 217-246, 1997.
- Convergence of the pSeries for Stationary Processes *Proc. of the New York Journal of Math. Conference*, Vol 3A, p. 15-30, 1997.
- A weighted pointwise ergodic theorem *Annales de l'Institut Henri Poincare, vol 34*, n 1, 139-150,1998.
- Multiple recurrence and almost sure convergence of weakly mixing dynamical systems *Israel J. of Math., vol 103*, 111-125, 1998.
- Corrections to " A Wiener-Wintner property for the helical transform" *Erg. Th. and Dyn. Sys.,vol 18*,1331-1333 (1998).
- A note on the equation y=(I-T) x in L1 *Illinois J. of Math. vol 43*, 3, (1999) p. 540-541.
- Multiterm return time theorem for weakly mixing systems *Annales de L'Institut Henri Poincare, vol 36*, 2,153-165,(2000).
- Wiener Wintner theorems, *Kluwer Encyclopaedia of Mathematics*, accepted (May 2000).
- Properties of Wiener Wintner dynamical systems(with K. Nicolaou) *Bull. Soc. Math. France, 129*, (3), 2001, p. 361-377.
- Spectral Characterization of Wiener Wintner Dynamical systems, *Compte Rendus de l'Academie des Sciences t. 332*, Serie I, p.321-324, 2001.
- Spectral Characterization of Ergodic Dynamical Systems, *Contemporary Mathematics, 284*, 13-22, 2001.
- Wiener Wintner Dynamical Systems *Erg. Th.. and Dyn. Syst,23*, 1637-1654, 2003.
- Spectral Characterization of Wiener Wintner Dynamical Systems *Erg..Th. and Dynamical Systems, 24*, 2, 347-365, 2004.
- Duality and the one sided ergodic Hilbert transform, (preprint 2003) *Contemporary Mathematics 357*, "Chapel Hill Ergodic Workshops", 81-90, 2004.
- Counting and convergence in ergodic theory, (preprint 2004) (with Z. Buczolich and D. Mauldin), *Acta Univ. Carolinae, 45*, 2004, 5-21.
- Poitnwise convergence of nonconventional averages, (preprint 2003) *Coll. Math., vol 102*, 2, 245- 262, 2005.
- An L1 counting problem in ergodic theory (preprint 2003) (with Z. Buczolich and D. Mauldin), math.DS/0307384, *Journal d'Analyse Mathematique*, vol XCV, 221-241, 2005.
- On A. Zygmund 's differentiation conjecture (preprint 2006). math.CA/0609827
- Averages along cubes for not necessarily commuting measure preserving transformations, *Contemporary Math., vol.430*, 1-19, 2007.

- On the one sided Ergodic Hilbert transform (with M. Lin), *Contemporary Mathematics, vol.430*, 20- 39, 2007.
- Some open problems. *Ergodic theory and related fields*, 135–145, *Contemp. Math., 430, Amer. Math. Soc., Providence, RI*, 2007.
- A maximal inequality for the tail of the bilinear Hardy-Littlewood function (with Zoltan Buczolich), *Contemporary Mathematics, vol 485*, 7-11, 2009
- Some open problems. *Ergodic theory*, 159–162, Contemp. Math., 485, *Amer. Math. Soc., Providence, RI*, 2009.
- Pointwise convergence of ergodic averages along cubes, *J. Anal. Math.*2010), 241–269.
- The (Lp, Lq) bilinear Hardy Littlewood function for the tail (with Zoltan Buczolich) *Isr. J.Math., vol. 179*, 173-187, 2010.
- The (L1, L1) bilinear Hardy-Littlewood function and Furstenberg averages (with Zoltan Buczolich), *Revista Matematica Iberoamericana 26.3* (2010), 861-890.
- Pointwise characteristic factors for the multiterm return times theorem.(With Kim Presser) *Erg. Th. Dynam. Systems* 32 (2012), no. 2, 341–360.
- A survey of the return times theorem. *Ergodic theory and dynamical systems,*(with Kim Presser) 19–58, De Gruyter Proc. Math., *De Gruyter, Berlin*, 2014.
- Pointwise characteristic factors for Wiener-Wintner double recurrence theorem.(with David Duncan and Ryo Moore) *Erg. Th. Dynam. Systems* 36 (2016), no. 4, 1037–1066.
- A good universal weight for nonconventional ergodic averages in norm.(with Ryo Moore) *Ergodic Theory Dynam. Systems* 37 (2017), no. 4, 1009–1025.
- Extension of Wiener-Wintner double recurrence theorem to polynomials (with Ryo Moore), *J. Anal. Math.* 134 (2018), no. 2, 597–613.
- Coboundaries of nonconventional ergodic averages, arxiV:1805.07655-(2018)
- Pointwise double recurrence and nilsequences, arXiv:1504.05732-(2018).
- New Estimates on the bounds of B runel's operator(with R. S. Hallyburton, S. McMahon, S. Schmidt, C. Schoone) Coll. Math.,169 (2022) 117-139
- Spatial Temporal Differentiations (with Aidan Young), Acta Mathematica Hungarica-168, 301–344 (2022)
- Non-autonomous spatial temporal differentiation theorems for group endomorphisms (with A. Young) Real Analysis Exchange, 47, no 2, 2022
- Wiener-Wintner Ergodic Theorem, in brief, **Invited feature article-** Notices of the AMS Notices of the AMS, 69, 2, February 2022, p. 198-209.
- Collatz map as a power bounded nonsingular transformation, Studia Math. revised version Nov.2023..
- Syracuse Maps as Non-singular Power-Bounded Transformations and Their Inverse Maps (with A. Hande and E. Ebbinghausen), arXiv:2208.11801, 2022., submitted.

Main recent invited Talks

1) Invited Colloquium talk- Wiener-Wintner Ergodic theorem, Penn-State-Feb 2022

2) Plenary speaker – *The Wiener Wintner Ergodic theorem* – Chapel Hill ETDS workshops - june 2021.

2) Invited colloquium speaker – Queen's University – Toronto- Canada – April 2021 *Recurrence and return times*

3) Invited speaker Queen's University – Toronto April 2021 *Wiener Wintner ergodic theorem-*

4) Invited series of four one hour lectures at Shenzhen- Sustech China- 04/12/19-06/19/19.

5) Invited to give a 50 mn talk at the international conference -June 17-22- 2018 at Sustech

6) Invited to give a 40 mn talk at the international conference- 06/09/18-06/16/18 in Poland

7) Invited to several other conferences, the last one being at Eotvos University in Hungary - June 2019

Some other Invited Research talks (Not including workshops talks), Frontiers of operator dynamics", CIRM (Luminy, France) September 28 to October 02, 2015 (invited by Sophie Grivaux and Mariusz Lemanczyck), Conference on Dynamical Systems at ICTP, Trieste July 27 - August 07, 2015.(invited by J.C. Yoccoz and S. Luzzato), University Paris 6 –Jussieu, October 2011 (Invited by J-P Thouvenot), Rice University, April 2011, (invited by A. Bufetov and D. Damjanovic),