# **Daniel Litt**

University of Toronto, Math Department

Email: daniel.litt@utoronto.ca Website: www.daniellitt.com

## **Current position**

Assistant Professor, University of Toronto

### **Previous positions**

Assistant Professor, University of Georgia

Member, Institute for Advanced Study

NSF Postdoctoral Fellow, Columbia University

## Area of specialization

Algebraic geometry, number theory

### **Education**

PhD in Mathematics, Stanford University

Thesis advisor: Ravi Vakil

Thesis title: Non-abelian Lefschetz hyperplane theorems

2010 BA in Mathematics, Harvard University

#### Grants, honors & awards

2022-2027	NSERC Grant, "Anabelian methods in arithmetic and algebraic geometry"
2020-2023	NSF Algebra and Number Theory Grant DMS-2001196, "Anabelian methods in arithmetic
	and algebraic geometry" (ended 2022 due to move to Canada)
2020	Simons Collaboration Grant (declined due to conflict with NSF grant)
2015-2018	NSF Mathematical Sciences Postdoctoral Research Fellowship, Columbia University
2013-2015	Achievement Rewards for College Scientists (ARCS) Fellowship
9-12/2014	Stanford-Princeton Exchange Scholar
2014,2016	US Junior Oberwolfach Fellow
2010-2013	NSF Graduate Research Fellowship

#### **Articles & talks**

#### **Preprints**

- Lam, Joshua; Landesman, Aaron; Litt, Daniel "Finite braid group orbits on  $SL_2$ -character varieties," arXiv preprint arXiv:2308.01376
- Lam, Joshua; Litt, Daniel, "Geometric local systems on the projective line minus four points," arXiv preprint arXiv:2305.11314
- Engel, Philip; Krishnamoorthy, Raju; Litt, Daniel, "The Manin-Mumford conjecture in genus 2 and rational curves on K3 surfaces," arXiv:2208.08729
- Katz, Eric; Litt, Daniel, "p-adic iterated integration on semistable curves," arXiv:2202.05340
- Litt, Daniel, "Arithmetic Restrictions on Geometric Monodromy," arXiv preprint arXiv:1607.05740.

#### Accepted Articles

- Landesman, Aaron; Litt, Daniel, "Canonical representations of surface groups," accepted at *Annals of Mathematics*, arXiv:2205.15352
- Landesman, Aaron; Litt, Daniel, "Geometric local systems on very general curves and isomonodromy," accepted at *Journal of the AMS*, arXiv:2202.00039
- Landesman, Aaron; Litt, Daniel, "Prill's problem," accepted, Algebraic Geometry
- Landesman, Aaron; Litt, Daniel, "Applications of the algebraic geometry of the Putman-Wieland conjecture," accepted, *Proceedings of the London Mathematical Society*
- Landesman, Aaron; Litt, Daniel, "An introduction to the algebraic geometry of the Putman-Wieland conjecture," accepted, *European Journal of Mathematics*
- Bisogno, Dean; Li, Wanlin; Litt, Daniel; Srinivasan, Padmavathi, "Group-theoretic Johnson classes and a non-hyperelliptic curve with torsion Ceresa class, arXiv preprint arXiv:2004.06146, accepted, *EPIGA*
- Javanpeykar, Ariyan, and Daniel Litt. "Integral points on algebraic subvarieties of period domains: from number fields to finitely generated fields." manuscripta mathematica (2023): 1-22.
- Kadets, Borys; Litt, Daniel, "Level structure, arithmetic representations, and noncommutative Siegel linearization," arXiv preprint arXiv:2107.02213, accepted at Journal für die reine und angewandte Mathematik (Crelle's Journal)
- Li, Wanlin; Litt, Daniel; Salter, Nick; Srinivasan, Padmavathi, "Surface bundles and the section conjecture," arXiv preprint arXiv:2010.07331, accepted at Mathematische Annalen
- Kedlaya, Kiran; Litt, Daniel; Witaszek, Jakub, "Tamely ramified morphisms of curves and Belyi's theorem in positive characteristic," arXiv preprint arXiv:2010.01130, accepted at IMRN
- Betts, Alexander; Litt, Daniel, "Semisimplicity and weight-monodromy for fundamental groups," arXiv preprint arXiv:1912.02167, accepted at Proceedings of the Simons Symposium on p-adic Hodge Theory
- Lawrence, Brian; Litt, Daniel, "Representations of surface groups with universally finite mapping class group orbit" arXiv preprint arXiv:1907.03941, accepted at Math Research Letters.

- Litt, Daniel, "Arithmetic Representations of Fundamental Groups II: Finiteness," Duke Math. J. 170(8): 1851-1897.
- Lesieutre, John; Litt, Daniel, "Dynamical Mordell-Lang and Automorphisms of Blow-Ups," Algebraic Geometry. 2019 Jan 1; 6(1): 1-25.
- Litt, Daniel, "Vanishing for Frobenius Twists of Ample Vector Bundles," Tohoku Mathematical Journal 71 (4), 549-557.
- Litt, Daniel, "Arithmetic Representations of Fundamental Groups I," Invent. math. 214, 605-639 (2018).
- Litt, Daniel, "Non-Abelian Lefschetz Hyperplane Theorems," J. Algebraic Geom. 27 (2018), no. 4, 593-646.
- Litt, Daniel, "Manifolds Containing an Ample  $\mathbb{P}^1$ -bundle," manuscripta mathematica 152 (3-4), 533-537.
- Litt, Daniel, "Zeta Functions of Curves With No Rational Points," Michigan Math. J., Volume 64, Issue 2 (2015), 383-395..
- Litt, Daniel, "Symmetric Powers Do Not Stabilize," Proceedings of the American Mathematical Society 142 (12), 4079-4094.
- Abel, Zachary; Kominers, Scott; Litt, Daniel, "A Categorical Construction of Ultrafilters," *Rocky Mountain J. Math.* Volume 40, Number 5, 1611-1617.

#### Expository work and outreach

- Haran, Brady; Litt, Daniel, Numberphile video on Poncelet's Porism: Link
- Knudson, Kevin; Lamb, Evelyn; Litt, Daniel, episode of the "My Favorite Theorem" podcast on Dirichlet's theorem on primes in arithmetic progressions
- Alper, Jarod; Litt, Daniel; Vogt, Isabel, "A Guide to Organizing a Virtual Conference,"

  AMS Notices
- Haran, Brady; Litt, Daniel, Numberphile video on the Dehn invariant: Link

#### Invited Talks

- Hodge theory and some questions about  $2 \times 2$  matrices, Van Tage Seminar
- 2023 Higher Prym monodromy, Washington University in St. Louis Algebraic Geometry Seminar
- Hodge theory and some questions about  $2 \times 2$  matrices, Washington University in St. Louis Colloquium
- Hodge theory and some questions about  $2 \times 2$  matrices, Cornell Algebraic Geometry Seminar
- Hodge theory and some questions about  $2 \times 2$  matrices, Fields Symposium in honor of Caucher Birkar
- Hodge theory and some questions about 2 × 2 matrices, McMaster Colloquium
- Hodge theory and some questions about  $2 \times 2$  matrices, Montreal CIRGET seminar
- 2023 Canonical representations of surface groups, plenary at Journées Arithmetiques
- 2023 Canonical tuples of matrices, colloquium, Yau Mathematical Sciences Center at Tsinghua university
- 2023 Hodge theory of mapping class group dynamics, University of Chicago Geometry Seminar

2023	Canonical tuples of matrices, Colloquium, Northwestern University
2023	Canonical tuples of matrices, Colloquium, University of Toronto
2023	Canonical representations of surface groups, Fields Number Theory seminar
2023	Canonical representations of surface groups, "Periods, Shafarevich Maps and Applications"
202)	conference, IMSA
2023	Canonical representations of surface groups, University of Michigan algebraic geometry seminar
2022	Canonical representations of surface groups, Quebec-Vermont Number Theory Seminar
2022	Canonical representations of surface groups, UVA Number Theory Seminar
2022	Canonical representations of surface groups, Harvard-MIT algebraic geometry seminar
2022	Canonical representations of surface groups, NT seminar, University of Toronto
2022	Canonical representations of surface groups, Colloquium, Queen's University
2022	Canonical representations of surface groups, Colloquium, UW Madison, part of "Arithmetic
2022	and topology of global fields" conference
2022	Canonical representations of surface groups, Web seminar on Painlevé VI and related topics,
2022	University of Kobe
2022	Hodge theory of mapping class group dynamics, Georgia Tech algebra seminar
2022	Dynamics of mapping class groups, Conference on Stability in Topology, Arithmetic, and
2022	Representation Theory 2022, Purdue University
2022	Geometric local systems on very general curves and isomonodromy, UGA algebraic geometry
2022	seminar
2022	Representations with finite mapping class group orbit, UGA topology seminar
2022	
2021	Arithmetic representations and non-commutative Siegel linearization, Iskovskikh seminar, Steklov mathematical institute
2021	Colloquium, University of Georgia
2021	Hodge theory of the Putman-Wieland conjecture, Mittag-Leffler Institute workshop on motives
	and Hodge theory
2021	Non-commutative Siegel linearization, level structures, and arithmetic representations, Wuppertal
	algebra seminar
2021	The tropical section conjecture, UCSB arithmetic and geometry seminar
2021	Generalized Prym representations and canonical curves, UGA algebraic geometry seminar
2021	Hodge, p-adic, and tropical integrals Columbia arithmetic geometry and automorphic forms
	seminar
2021	Hodge, p-adic, and tropical integrals Purdue algebraic geometry seminar
2021	Hodge, p-adic, and tropical integrals Harvard number theory seminar
2021	Hodge, p-adic, and tropical integrals Oberwolfach workshop, on "Homotopical and geometric
	Galois theory"
2021	What is a seminar, What isthe étale fundamental group?
2021	Tropical Geometry in Frankfurt, The tropical section conjecture
2021	Colloquium, University of Toronto
2020	Colloquium, UC Berkeley
2020	Integral aspects of arithmetic local systems, Mini workshop: Hodge Theory, Period Mapping
	and Local System, CRM
2020	The arithmetic of polynomials, Talk Math With Your Friends Seminar
2020	The tropical section conjecture, Leiden Algebra, Geometry, and Number Theory Seminar
2020	Colloquium, West Chester University
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2020	Colloquium, UGA
2020	The section conjecture at the boundary of $\mathcal{M}_q$ , UCSD algebraic geometry seminar
2020	The section conjecture at the boundary of $\mathcal{M}_q$ , Western Algebraic Geometry Symposium
	(delayed due to COVID)
2020	Independence of $\ell$ for higher Ceresa cycles, Columbia University (delayed due to COVID)
2020	The section conjecture at the boundary of $\mathcal{M}_q$ , UChicago number theory seminar (delayed
	due to COVID)
2020	The section conjecture at the boundary of $\mathcal{M}_q$ , University of Wisconsin number theory seminar
2020	Impossible numbers and unknowable truths, public lecture, Furman University
2020	Arithmetic of algebraic varieties, Furman University, Colloquium
2020	The section conjecture at the boundary of $\mathcal{M}_g$ , BC-MIT number theory seminar
2020	The section conjecture at the boundary of $\mathcal{M}_g$ , Stanford
2020	The section conjecture at the boundary of $\mathcal{M}_q$ , OSU
2020	The section conjecture at the boundary of $\mathcal{M}_q$ , Caltech
2019	The section conjecture at the boundary of $\mathcal{M}_q$ , Algebraic Geometry and Arithmetic Geometry
2019	Conference 2019, USTC, Hefei
2019	Finiteness and discreteness results for representations of arithmetic fundamental groups I and II,
2019	Wild Ramification and Irregular Singularities, IMPAN, Warsaw
2019	Arithmetic and Representation Theory of Fundamental Groups, Arithmetic Topology, PIMS,
2019	UBC
2019	Arithmetic and Monodromy Representations, Symposium on Hodge Theory, Arithmetic
)	and Moduli, PIMS, UBC
2019	Arithmetic and Representation Theory of Fundamental Groups, Simons Symposium on p-adic
2019	Hodge Theory, Schloss Elmau
2019	Three-lecture minicourse on Arithmetic and the Representation Theory of Fundamental Groups,
)	workshop on "Galois Representations, Integral Points, Unlikely Intersections" at Universität
	Mainz
2019	Arithmetic Dynamics and Monodromy Representations, UGA AGANT Seminar
2019	Arithmetic Dynamics and Monodromy Representations, Courant Algebraic Geometry Seminar
2019	Arithmetic and Representation Theory of Fundamental Groups, Rutgers Number Theory Seminar
2019	Arithmetic and Representation Theory of Fundamental Groups, IPAM Conference on "Braids,
)	Resolvent Degree, and Hilbert's 13th Problem"
2019	Monodromy Representations and Arithmetic, Johns Hopkins Number Theory Seminar
2018	Monodromy Representations and Arithmetic, University of Maryland Number Theory Seminar
2018	The Tate Curve, Preparatory Lecture for Peter Scholze's Chow Lectures at MPI Leipzig
2018	Monodromy Representations and Arithmetic, Rice Algebraic Geometry Seminar
2018	Monodromy Representations and Arithmetic, Penn State Algebraic Geometry Seminar
2018	Monodromy Representations and Arithmetic, Yale Algebraic Geometry Seminar
2018	Monodromy Representations and Arithmetic, Joint NYU-Columbia-CUNY Number Theory
	Seminar
2018	Monodromy Representations and Arithmetic, Princeton University Algebraic Geometry Seminar
2018	Monodromy Representations and Arithmetic, Institute for Advanced Study
2018	Finiteness for Monodromy Representations, Joint International Meetings of the Chinese
	Mathematical Society and the American Mathematical Society, Fudan University
2018	Canonical Paths on Algebraic Varieties, Northeastern University Algebraic Geometry Seminar
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2018	Canonical Paths on Algebraic Varieties, University of Michigan Algebraic Geometry seminar
2018	Arithmetic Representations of Fundamental Groups, University of Minnesota Colloquium
2018	Arithmetic Representations of Fundamental Groups, USC Colloquium
2018	Arithmetic Representations of Fundamental Groups, University of California, Irvine Colloquium
2017	Arithmetic Representations of Fundamental Groups, University of Georgia Colloquium
2017	Arithmetic Representations of Fundamental Groups, University of Arizona Algebraic Geometry
	Seminar
2017	Arithmetic Representations of Fundamental Groups, OSU Algebraic Geometry Seminar
2017	Schlesinger and Painlevé Equations in Positive Characteristic, Stanford Algebraic Geometry
,	Seminar
2017	Arithmetic Representations of Fundamental Groups, UC Davis Algebraic Geometry Seminar
2017	Arithmetic Representations of Fundamental Groups, UBC Algebraic Geometry Seminar
2017	Arithmetic Representations of Fundamental Groups, NYU Algebraic Geometry Seminar
2017	Schlesinger and Painlevé Equations in Positive Characteristic, UIC Algebraic Geometry Seminar
,	Integral Aspects of Fundamental Groups, Conference on Étale and Motivic Homotopy Theory,
2017	Universität Heidelberg
2015	Integral Aspects of Fundamental Groups, BIRS Workshop on Nilpotent Fundamental Groups
2017	Arithmetic Restrictions on Geometric Monodromy, Harvard/MIT Algebraic Geometry Seminar
2017	Arithmetic Restrictions on Geometric Monodromy, Purdue Algebraic Geometry Seminar
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2017	Arithmetic Restrictions on Geometric Monodromy, Yale Algebra and Number Theory Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, UIC Algebraic Geometry Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, UChicago Number Theory Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, Northwestern Number Theory Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, Wisconsin Algebraic Geometry Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, AIM Workshop: Rational Curves in Positive
	Characteristic
2016	Arithmetic Restrictions on Geometric Monodromy, Brown University Algebraic Geometry
	Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, Columbia Algebraic Geometry Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, UPenn Algebraic Geometry Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, Stanford Number Theory Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, Topological Approaches to Algebra and
	Arithmetic Geometry, University of Georgia
2016	Arithmetic Restrictions on Geometric Monodromy, University of Georgia Number Theory
	Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, Emory University Number Theory Seminar
2016	Arithmetic Restrictions on Geometric Monodromy, Oberwolfach Workshop on Arithmetic
	Geometry
2016	Automorphisms of Blowups, AMS Sectional Meeting, University of Utah
2016	Non-Abelian Lefschetz Hyperplane Theorems, Conference on Equivariant Algebraic Geometry
	and Algebraic Stacks, ANU Kioloa Campus, Australia
2016	Automorphisms of Blowups, ANU Canberra Algebraic Geometry Seminar
2016	Automorphisms of Blowups, Princeton Algebraic Geometry Seminar
2010	
2016	Non-Abelian Lefschetz Hyperplane Theorems, University of Utah Algebraic Geometry Seminar

2015	Hyperbolicity of Moduli Spaces and Arithmetic of Function Fields, Columbia Number Theory Seminar
2015	Non-Abelian Lefschetz Hyperplane Theorems, Stony Brook Algebraic Geometry Seminar
2015	Non-Abelian Lefschetz Hyperplane Theorems, Courant Algebraic Geometry Seminar
2015	Non-Abelian Lefschetz Hyperplane Theorems, Columbia University Algebraic Geometry
,	Seminar
2015	Geometric Lefschetz Hyperplane Theorems, Bay Area Algebraic Number Theory and Arithmetic Geometry Day
2014	Non-Abelian Lefschetz Hyperplane Theorems, University of Michigan Algebraic Geometry Seminar
2014	Non-Abelian Lefschetz Hyperplane Theorems, Harvard Algebraic Geometry Seminar
2014	Non-Abelian Lefschetz Hyperplane Theorems, UIC Algebraic Geometry Seminar
2014	Non-Abelian Lefschetz Hyperplane Theorems, AMS Section Meeting, SFSU, Special Session on Algebraic Geometry
2014	Non-Abelian Lefschetz Hyperplane Theorems, Oberwolfach Classical Algebraic Geometry Workshop 5 minute talk
2014	Non-Abelian Lefschetz Hyperplane Theorems, Berkeley Student Algebraic Geometry Seminar
2013	Motivic Analytic Number Theory, Graduate Workshop on Geometry of Hilbert Schemes, Simons Center for Geometry and Physics
2013	Zeta Functions in Geometry and Topology, Geometry and Topology: Berkeley and Stanford Icebreaker Conference
2013	Motivic Analytic Number Theory, GAeL XXI, KTH Royal Institute of Technology
2013	Motivic Analytic Number Theory, Columbia University Algebraic Geometry Seminar
2013	Motivic Analytic Number Theory, AMS Sectional Meetings, UC Boulder, Special Session on Algebraic Geometry
2012	Motivic Analytic Number Theory, UC Irvine Number Theory Seminar
2012	Line Bundles on Plane Curves, UC Berkeley Research Training Group (RTG) Workshop on Tensors and Their Geometry
2012	The Cotangent Complex, University of Michigan RTG Workshop on Derived Algebraic Geometry (expository)
2012	Introduction to the Landscape of Generalized Euler Characteristics, UC Berkeley Commutative Algebra and Algebraic Geometry Seminar
2012	Introduction to the Landscape of Generalized Euler Characteristics, Stanford Algebraic Geometry
	Seminar
	Professional Service, Teaching & Seminars
	Professional Service, Conferences, and Products
2022 <sup>-</sup> 2022 <sup>-</sup>	Postdoc committee member, UofT Colloquium and invited speaker series committee member, UofT

Co-organized the online iteration of the Western Algebraic Geometry Symposium (joint

2021-

2022

2020

JMM Program committee member

Co-organized ADDING conference at University of Georgia

Organized AGONIZE conference 2020 Founding member, moderator, for AGS discord server (part of Ravi Vakil's AGITTOC 2020-2022 lecture series on algebraic geometry), with over 1000 members Climate committee member, UGA 2020-2022 REU Mentor, Columbia University: Supersingular hypersurfaces, joint with Alex Perry 2018 Arizona Winter School on perfectoid spaces, study group leader 2017 PhD Dissertation Committee Member (3 students) 2017 Oral Exams Committee Member (5 students) 2016-Graduate Student Admissions Committee 2016-2017 REU mentor, Columbia University: Representation Theory in Graph Theory, joint with 2017 David Hansen Undergraduate research mentor (2 students) 2016-Columbia Undergraduate Mathematics Society Speaker 2016-REU mentor, Columbia University: Properties of Random Varieties, joint with Daniel 2016 Halpern-Leistner US Organizer, GAeL XXII & XXIII 2013-2015 Referee for Annals, Duke, Selecta, Cambridge Journal of Mathematics, Memoirs, Proceedings, 2013-Algebra and Number Theory, de Gruyter, Cambridge University Press, International Mathematics Research Notices, Journal of Pure and Applied Algebra, etc. Stanford Math Circle: The Music of the Spheres, The Fundamental Theorem of Algebra, Tiling 2012-2014 Problems Stanford Undergraduate Research in Mathematics Mentor: Zeroes of Linear Recurrences, 2012-2013 Class Numbers of Imaginary Quadratic Number Fields Stanford SUMO Speaker Series: The Music of the Spheres, Zeroes of Integer Linear Recurrences, 2011-2013 Morse Theory, Stratifications, and Euler Characteristic, Tiling Problems Stanford SPLASH: The Music of the Spheres, How Do We Know What We Know? 2011-2013 Stanford Undergraduate Mathematics Organization (SUMO) Math Tournament 2013 Boston Math Circle: Ramsey Theory, 2010 MIT SPLASH: Ramsey Theory 2009 Seminars Organized Learning seminar on rigid local systems at UofT 2023 Learning seminar on Catalan's conjecture at UGA 2021 Serre on Zoom seminar (SeZoom) at UGA Zannier on Zoom seminar (ZaZoom) at UGA 2020 Bring in our problem seminar, y'all (BIOPSY) at UGA 2020 Classic Reading in Arithmetic and Algebraic Geometry (CRAAG) at UGA 2020 UGA AG and NT seminars (co-organizer) 2019-2022 Applications of the Geometric Langlands Program, joint with Kiran Kedlaya 2019 Mathematical Conversations, joint with Sara Venkatesh, Jeroen Zuiddam, and Helmut 2018-2019

with Jarod Alper and Isabel Vogt), with over 1000 registered attendees

Bring Your Own Problem Seminar, joint with Guy Moshkovitz

Hofer

2019

2016-2018 2015 2014 2012-2013 2011-2013 2011-2012 2010-2011	Columbia Algebraic Geometry Seminar (joint with Michael Thaddeus (2016-2017), joint with Johan de Jong and Alex Perry (2017-2018))  The Tate Conjecture (co-organized with Johan de Jong, Yiwei She, and Aanand Deopurkar); Applications of the Langlands Philosophy (Princeton, co-organized with Lucia Mocz); Classics Reading in Algebraic Geometry; Student/Special Algebraic Geometry Seminar; Hodge Theory Learning Seminar; Secret Cassels-Fröhlich Seminar
	PhD students
2022-	Charlie Wu
2022-	Andy Ramirez-Cote
2021-	Shuofeng (Simon) Xu
2020-	Santanta Afton (GA Tech, advised jointly with Jennifer Hom)
2019-	Aleksander Shmakov
2020-2022	Postdocs supervised Borys Kadets
	Teaching
2022	Topics course on Hodge theory, UofT, Fall semester
2022	Introduction to Proof, UofT, Fall semester
2022	Commutative algebra, UGA, Spring semester
2021	Rational points on algebraic varieties, UGA, Fall semester
2020	Étale cohomology, UGA, Fall Semester
2020	Calculus III, UGA, Fall Semeseter
2019	Calculus I, UGA, Fall Semester
2017	Topics in Algebraic Geometry: Deformation Theory, Columbia, Fall Semester
2016	Calculus III, Columbia, Fall Semester
2014	Math 51 (Linear Algebra and Multivariable Calculus) TA, Stanford, Winter Quarter
2013	Math 210C (Compact Lie Groups) Course Assistant, Stanford Course Assistant, Math 25, Harvard University
2007	Course Assistant, math 25, Harvard Chiversity