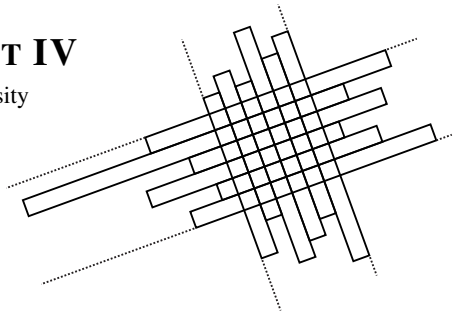
RICHARD PEABODY KENT IV

Department of Mathematics · Brown University
Box 1917 · Providence, RI 02912
rpkfour@gmail.com (401) 863-1137



PERSONAL INFORMATION

Birth date July 26, 1977

Citizenship United States of America

Webpage www.math.brown.edu/∼rkent

EDUCATION

Ph.D. (Mathematics) University of Texas at Austin · August 2006
ADVISOR: Cameron McA. Gordon

B.A. (Mathematics and Literature) University of North Carolina at Asheville · May 1999

CURRENT POSITION

Tamarkin Assistant Professor · Brown University

VISITING POSITIONS

Member · MSRI · Fall 2007

Visiting Professor · Centre Bernoulli, E.P.F. Lausanne · August 2005

AWARDS, HONORS, AND FELLOWSHIPS

National Science Foundation Postdoctoral Fellowship 2006

Clay Mathematics Institute Liftoff Fellowship Summer 2006

Frank Gerth III Dissertation Award · University of Texas at Austin · 2006

Finalist, American Institute of Mathematics Five–Year Fellowship 2006

Donald D. Harrington Dissertation Fellowship · University of Texas at Austin · 2005–2006

University Continuing Fellowship · University of Texas at Austin · 2003–2004

University Preemptive Fellowship · University of Texas at Austin · Spring–Summer 2001

Departmental Fellowship · University of Texas at Austin · Fall 2000 · Summer 2001

MATHEMATICAL WRITING

(preprints available at http://www.math.brown.edu/∼rkent)

14 *Bers slices are Zariski dense* (with D. Dumas) (in preparation).

13 *Intersections and joins of free groups* (submitted).

If H and K are rank–2 subgroups of a free group, then the rank of their intersection is less than or equal to 4 minus the rank of the subgroup they generate—this has been used by M. Culler and P. Shalen to obtain information regarding the volumes of hyperbolic 3–manifolds. If H and K have ranks h and k and their join has rank at least $(h+k+1)/2$, then their intersection has rank

no more than $(h-1)(k-1)+1$.

(The first theorem has also been obtained by L. Louder and D. B. McReynolds. The second one has also been obtained by Louder.)

12 *Slicing, skinning, and grafting* (with D. Dumas)
(to appear in the American Journal of Mathematics).

We prove that a Bers slice is never algebraic. A corollary is that skinning maps are never constant.

11 *Trees and mapping class groups* (with C. J. Leininger and Saul Schleimer) (submitted).

There is a forgetful map from the mapping class group of a punctured surface to that of the surface with one fewer puncture. We prove that finitely generated purely pseudo-Anosov subgroups of the kernel of this map are convex cocompact in the sense of B. Farb and L. Mosher. In particular, we obtain an affirmative answer to their question of local convex cocompactness of K. Whittlesey's group.

We also relate the action of this kernel on the curve complex to a family of actions on trees. This quickly yields new proofs of theorems of J. Harer and I. Kra.

10 *Skinning maps* (submitted).

Let M be a hyperbolic 3–manifold with nonempty totally geodesic boundary. We prove that there are upper and lower bounds on the diameter of the skinning map of M that depend only on the volume of the hyperbolic structure with totally geodesic boundary, answering a question of Y. Minsky. This is proven via a filling theorem, which states that as one performs higher and higher Dehn fillings, the skinning maps converge uniformly on all of Teichmüller space.

We also exhibit manifolds with totally geodesic boundaries whose skinning maps have diameter tending to infinity, as well as manifolds whose skinning maps have diameter tending to zero (the latter are due to K. Bromberg and the author).

In the final section, we give a proof of Thurston's Bounded Image Theorem.

9 *Subgroups of mapping class groups from the geometrical viewpoint* (with C. J. Leininger)
In the tradition of Ahlfors–Bers, IV, 119–141. Contemporary Mathematics, 432,
American Mathematical Society, Providence, RI, 2007.

We survey the analogy between Kleinian groups and subgroups of the mapping class group of a surface.

8 *Uniform convergence in the mapping class group* (with C. J. Leininger)
(to appear in Ergodic Theory and Dynamical Systems).

We characterize convex cocompact subgroups of the mapping class group of a surface in terms of uniform convergence actions on the zero locus of the limit set.

7 *Shadows of mapping class groups: capturing convex cocompactness* (with C. J. Leininger)
(to appear in Geometric and Functional Analysis).

We strengthen the analogy between convex cocompact Kleinian groups and convex cocompact subgroups of the mapping class group of a surface (in the sense of B. Farb and L. Mosher).

6 *Surface groups are frequently faithful* (with J. DeBlois),
Duke Mathematical Journal 131, no. 2 (2006), 351–362.

Let π be the fundamental group of a closed hyperbolic surface, $\mathbb{K} \in \{\mathbb{R}, \mathbb{C}\}$. We show that the set

of faithful representations is dense in $\mathrm{Hom}(\pi, \mathrm{PSL}_2(\mathbb{K}))$ equipped with its Euclidean topology, answering a question of W. Goldman. We also prove the existence of faithful representations in $\mathrm{Hom}(\pi, \mathrm{PU}(2,1))$ with certain nonintegral Toledo invariants.

5 *Totally geodesic boundaries of knot complements*,
Proceedings of the American Mathematical Society 133 (2005), 3735–3744.

Let M be a compact 3–manifold whose boundary is a closed hyperbolic surface and let C be a simple closed curve in ∂M. Then for all $\varepsilon > 0$, M contains a hyperbolic knot K in whose complement ∂M is totally geodesic and the length of C is less than ε.

4 *Achievable ranks of intersections of finitely generated free groups*,
International Journal of Algebra and Computation, Vol. 15 No. 2 (2005) 339-341.

We answer a question due to A. Myasnikov by proving that all expected ranks occur as the ranks of intersections of finitely generated subgroups of free groups.

3 *A short proof that composite twisted unknots are singly twisted unknots*,
Journal of Knot Theory and its Ramifications 13 (2004), no. 7, 873-875.

We present a short proof of a theorem of Hayashi and Motegi and (independently) Goodman-Strauss that only singly twisted unknots are composite.

2 *Bundles, handcuffs, and local freedom*,
Geometriae Dedicata 106 (2004), 145-159.

We answer a question of J. Anderson's by producing infinitely many commensurability classes of fibered hyperbolic 3–manifolds whose fundamental groups contain subgroups that are locally free and not free. These manifolds are obtained by performing 0–surgery on a collection of knots with the same properties.

1 *A geometric and algebraic description of annular braid groups* (with D. Peifer),
International Journal of Algebra and Computation, Vol. 12, Nos. 1 & 2 (2002) 85-97.

We prove that Artin's braid group is virtually a semidirect product of the affine braid group by the group of integers.

LECTURES

20 *Skinning maps*—Ahlfors–Bers Colloquium (workshop) · Rutgers University · Spring 2008

19 *Slicing, skinning, and grafting*—Topology Seminar · University of Texas at Austin · Spring 2008

18 *The leopard and Lobachevskii*—MSRI · Fall 2007

17 *The beginning of the end*—Geometry and Dynamics in Surfaces and 3–Manifolds · Brown University · Spring 2007

16 *Skinning maps*—Topology Seminar · Princeton University · Spring 2007

15 *Skinning maps*—Topology Seminar · University of Texas at Austin · Spring 2007

14 *Geometry and the mapping class group*—Midwest Topology Seminar · University of Illinois at Chicago · Spring 2007

13 *Skinning maps*—Geometry Seminar · California Institute of Technology · Spring 2007

12 *Skinning maps*—Topology/Geometry Seminar · Yale · Fall 2006

11 *Skinning maps*—AMS Sectional Meeting · University of Connecticut · Fall 2006

10 *Being purely pseudo-Anosov*—The 2nd annual William Rowan Hamilton Geometry and Topology Workshop · Trinity College, Dublin · Fall 2006

9 *The beginning of the end*—Hyperbolic Geometry Workshop · Program at the Fields Institute: Holomorphic Dynamics, Laminations, and Hyperbolic Geometry · Spring 2006

8 *Boundaries of hyperbolic* 3*–manifolds*—Georgia Topology Conference · Spring 2006

7 *Totally geodesic boundaries of* 3*–manifolds*—Thesis defense · Topology Seminar · University of Texas at Austin · Spring 2006

6 *Shadows of mapping class groups: capturing convex cocompactness*—Twenty–First Wasatch Topology Conference · Park City · 2005

5 *Shadows of mapping class groups: capturing convex cocompactness*—Topology Seminar · University of Texas at Austin · Spring 2005

4 *Surface groups are frequently faithful*—AMS Central Section Meeting · Meeting #1001 · Northwestern University · October 2004

3 *Totally geodesic boundaries of knot complements*—Topology Seminar · University of Texas at Austin · Fall 2004

2 *Bundles, handcuffs, and local freedom*—Qualifying examination · Topology Seminar · University of Texas at Austin · Spring 2003

1 *The Torus Theorem*—Preliminary Examination · Topology Seminar · University of Texas at Austin · Fall 2001

TEACHING

Spring 2009 (scheduled)–Assistant Professor: Math 1010–Analysis: Functions of One Variable · Brown University

Spring 2009 (scheduled)–Assistant Professor: Math 0100–Introductory Calculus II · Brown University

Fall 2008 (scheduled)–Assistant Professor: Math 0090–Introductory Calculus I · Brown University

Spring 2008–Assistant Professor: Math 0540–Honors Linear Algebra · Brown University

Fall 2004–Assistant Instructor: M305G–Elementary Functions and Coordinate Geometry · University of Texas at Austin

Fall 2001–Teaching Assistant/Grader: M373K–Algebraic Structures I and M367L–Topology II: Knot Theory · University of Texas at Austin

Fall 2000–Teaching Assistant: M403K–Business Calculus · University of Texas at Austin

Fall 1999–Instructor: Math 060–Basic Mathematics · Asheville–Buncombe Technical Community College

REFERENCES

Cameron McA. Gordon, University of Texas at Austin

Alan W. Reid, University of Texas at Austin

Jeffrey F. Brock, Brown University

Yair Minsky, Yale University

Bruce Palka, University of Texas at Austin (Teaching reference)