Preface

This collection of papers in commutative algebra stemmed out of the 2009 Fall Southeastern American Mathematical Society Meeting which contained three special sessions in the field:

- Special Session on Commutative Ring Theory, a Tribute to the Memory of James Brewer, organized by Alan Loper and Lee Klingler;
- Special Session on Homological Aspects of Module Theory, organized by Andy Kustin, Sean Sather-Wagstaff, and Janet Vassilev; and
- Special Session on Graded Resolutions, organized by Chris Francisco and Irena Peeva.

Much of the commutative algebra community has split into two camps, for lack of a better word: the Noetherian camp and the non-Noetherian camp. Most researchers in commutative algebra identify with one camp or the other, though there are some notable exceptions to this. We had originally intended this to be a Proceedings Volume for the conference as the sessions had a nice combination of both Noetherian and non-Noetherian talks. However, the project grew into two Volumes with invited papers that are blends of survey material and new research. We hope that members from the two camps will read each others' papers and that this will lead to increased mathematical interaction between the camps.

As the title suggests, this volume, Progress in Commutative Algebra II, contains surveys on aspects of closure operations, finiteness conditions and factorization. Contributions to this volume have come mainly from speakers in the first and second sessions and from invited articles on closure operations, test ideals, Noetherian rings without finite normaliztion and non-unique factorization. The collection documents some current trends in two of the most active areas of commutative algebra.

Closure operations on ideals and modules are a bridge between Noetherian and non-Noetherian commutative algebra. The Noetherian camp typically study structures related to a particular closure operation such as the core or the test ideal or how particular closure operations yield nice proofs of hard theorems. The non-Noetherian camp approach closure operations from the view of multiplicative ideal theory and the relationship to Kronecker function rings. This volume contains a nice guide to closure operations by Epstein, but also contains an article on test ideals by Schwede and Tucker and one by Enescu which discusses the action of the Frobenius on finite dimensional vector spaces both of which are related to tight closure.

Finiteness properties of rings and modules or the lack of them come up in all aspects of commutative algebra. For instance, the division between the Noetherian and the

non-Noetherian crowd comes down to the property that all ideals in a Noetherian ring are finitely generated, by definition. However, in the study of non-Noetherian rings it is much easier to find a ring having a finite number of prime ideals. We have included papers by Boynton and Sather-Wagstaff and by Watkins that discuss the relationship of rings with finite Krull dimension and their finite extensions. Finiteness properties in commutative group rings are discussed in Glaz and Schwarz's paper. And Olberding's selection presents us with constructions that produce rings whose integral closure in their field of fractions is not finitely generated.

The final three papers in this volume investigate factorization in a broad sense. The first paper by Celikbas and Eubanks-Turner discusses the partially ordered set of prime ideals of the projective line over the integers. We have also included a paper on zero divisor graphs by Coykendall, Sather-Wagstaff, Sheppardson and Spiroff. The final paper, by Chapman and Krause, concerns non-unique factorization.

The first session was a Tribute to the Memory of James Brewer. As many of the authors participated in this session, we dedicate this volume to Brewer's memory. Enjoy!

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