Anderson, Eric C.; Skaug, Hans J. and Barshis, Daniel J.: **Next-generation sequencing for molecular ecology: a caveat regarding pooled samples**

**Abstract:** We develop a model based on the Dirichlet-compound multinomial distribution (CMD) and Ewens sampling formula to predict the fraction of SNP loci that will appear fixed for alternate alleles between two pooled samples drawn from the same underlying population. We apply this model to next-generation sequencing (NGS) data from Baltic Sea herring recently published by (Corander et al., Molecular Ecology, 2931-2940), and show that there are many more fixed loci than expected in the absence of genetic structure. However, we show through coalescent simulations that the degree of population structure required to explain the fraction of alternatively fixed SNPs is extraordinarily high and that the surplus of fixed loci is more likely a consequence of limited representation of individual gene copies in the pooled samples, than it is of population structure. Our analysis signals that the use of NGS on pooled samples to identify divergent SNPs warrants caution. With pooled samples, it is hard to diagnose when an NGS experiment has gone awry; especially when NGS data on pooled samples are of low read depth with a limited number of individuals, it may be worthwhile to temper claims of unexpected population differentiation from pooled samples, pending verification with more reliable methods or stricter adherence to recommended sampling designs for pooled sequencing e.g. Futschik & Schlotterer, Genetics, 186, 207; Gautier et al., Molecular Ecology, 3766-3779). Analysis of the data and diagnosis of problems is easier and more reliable (and can be less costly) with individually barcoded samples. Consequently, for some scenarios, individual barcoding may be preferable to pooling of samples. **MOLECULAR ECOLOGY, 23, (3), 502-512, FEB 2014**

Svard, Magnus and Oezcan, Hatice: **Entropy-Stable Schemes for the Euler Equations with Far-Field and Wall Boundary Conditions**

**Abstract:** In this paper entropy-stable numerical schemes for the Euler equations in one space dimension subject to far-field and wall boundary conditions are derived. Furthermore, a stable numerical treatment of interfaces between different grid domains is proposed. Numerical computations with second- and fourth-order accurate schemes corroborate the stability and accuracy of the proposed boundary treatment. **JOURNAL OF SCIENTIFIC COMPUTING, 58, (1), 61-89, JAN 2014**

Malyshev, A. N. and Sadkane, M.: **Fast solution of unsymmetric banded Toeplitz systems by means of spectral factorizations and Woodbury's formula**

**Abstract:** A fast algorithm for solving systems of linear equations with banded Toeplitz matrices is studied. An important step in the algorithm is a novel method for the spectral factorization of the generating function associated with the Toeplitz matrix. The spectral factorization is extracted from the right deflating subspaces corresponding to the eigenvalues inside and outside the open unit disk of a companion matrix pencil constructed from the coefficients of the generating function. The factorization is followed by the Woodbury inversion formula and solution of several banded
triangular systems. Stability of the algorithm is discussed and its performance is demonstrated by numerical experiments. NUMERICAL LINEAR ALGEBRA WITH APPLICATIONS, 21, (1), 13-23, JAN 2014