During the special program on Non-equilibrium Dynamics and Random Matrices in the year 2013-2014, major new research directions regarding random matrix theory and discrete particle systems were initiated. One of the themes represented in the program was the recently developed field of integrable probability. At the time, methods of Bethe ansatz and Macdonald processes were already quite popular. The program brought into resolution the question of constructing the KPZ fixed point and this was accomplished by Quastel (a key participant in the program), Matetski and Remenik. Another major development spurred by the program was that of stochastic vertex models and their analysis via the Yang Baxter equation. The stochastic six vertex model, first considered by Gwa and Spohn in the early 90s (Spohn was another key participant), has now taken a central role in integrable probability and the KPZ universality class. Another direction developed during the program was the role of Gibbsian line ensembles in integrable probability by Corwin (another participant) and Hammond. More recently these perspectives have been developed recently by Aggarwal, Borodin (another key participant) and Huang leading to a powerful new approach to study the space time scaling limit of many models in integrable probability.

Another key area of focus was stochastic PDEs. Hairer (a key long-term participant) had recently completed his Fields medal winning work on regularity structures and the program enabled for rapid dissemination of these ideas. Moreover, it brought these ideas in contact with old questions of mathematical and statistical physics, in particular related to constructive field theory. In the past decade Hairer and others have expanded this vast program in SPDEs and its applications in field theory.

Another major theme in this special program is random matrix theory. A key question on the optimal rate of convergence of Dyson's Brownian motions was established both in the bulk and near the edges. These results have greatly impacted the universality of spectral statistics of random matrices. In addition, the analysis on the eigenvalue statistics was extended to eigenvector statistics and it has led to progress on probabilistic quantum unique ergodicity.

The study of non-mean field random matrices and very sparse graphs, such as band matrices, Erdos-Renyi and d-regular graphs, started during the special year, eventually led to full delocalization for a wide class of band matrices and sparse random graphs. In particular, the connection between universality techniques and the Ramanujan property of random d-regular graphs, initiated at the program, also sees its major breakthrough recently, with a proof that the fluctuations in the Alon-Boppana conjecture are given by the Tracy-Widom law. Most of these progresses were through participants of the program or their students and postdoctoral researchers such as Landon, Huang, Erdos, and Yin. At the intersection of random matrix theory and number theory, the Fyodorov-Keating conjectures on typical high points of L-functions were presented during a workshop at the IAS. Members started to interact on this problem, in a decade-long collaboration which eventually led to its solution by Arguin, Bourgade and Radziwill (members of IAS during the program).