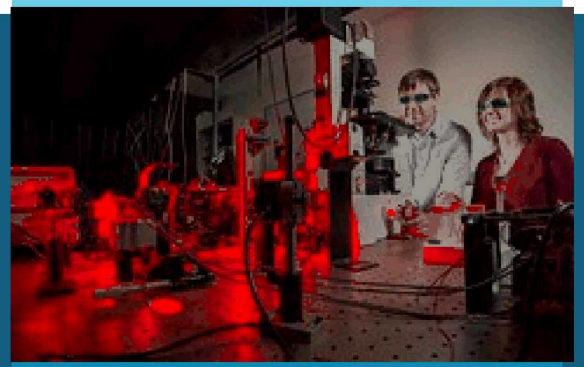
SAND2019-9572PE

Genomic Security Related Projects



PRESENTED BY

Brooke Harmon PhD, 8623, Christina Ting PhD, 5854

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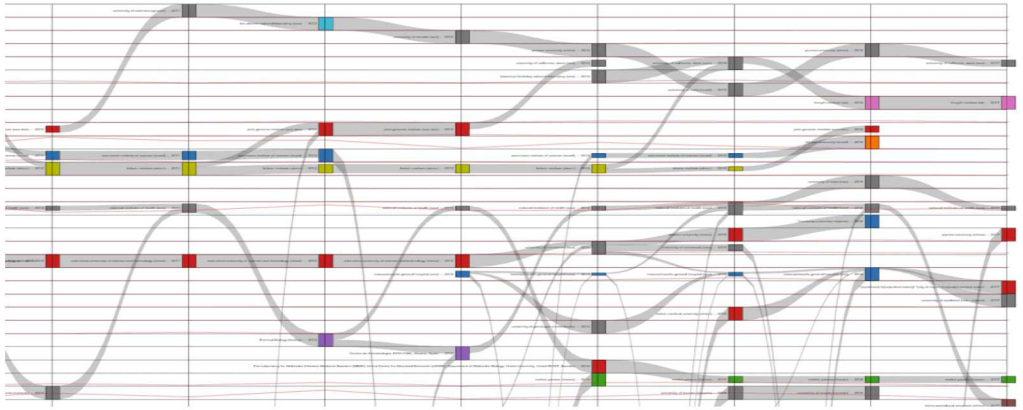
Detecting CRISPR Gene Editing and its Signatures PI: Jerilyn Temlin

Integrate cutting edge biology, bioinformatics, and data analytics technologies to develop robust tools for detecting CRISPR-based editing

THE WHO!



Author migration patterns: patterns in the flow of authors through institutions.

Expertise migration patterns: shifts in institutional expertise over time, as related to author migration

Analytical Methods

ROYAL SOCIETY OF CHEMISTRY

COMMUNICATION

Ultrasensitive multi-species detection of CRISPR-Cas9 by a portable centrifugal microfluidic platform†

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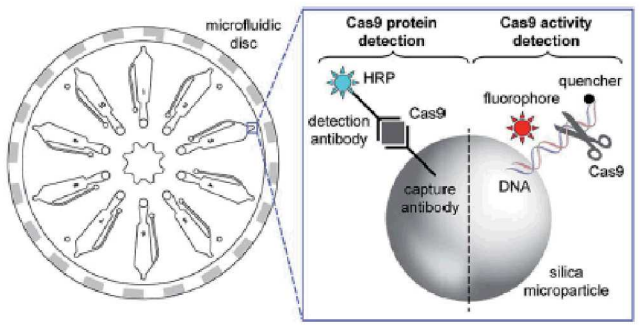
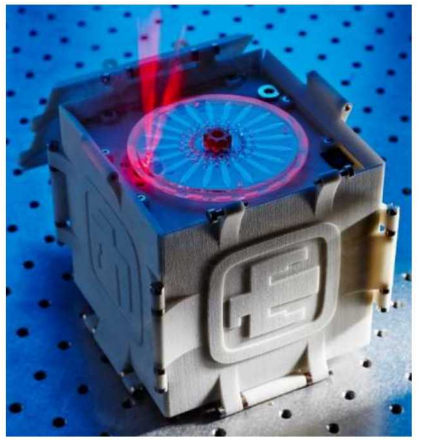




Discovery and Delivery of Inhibitors to Counter Gene Editing

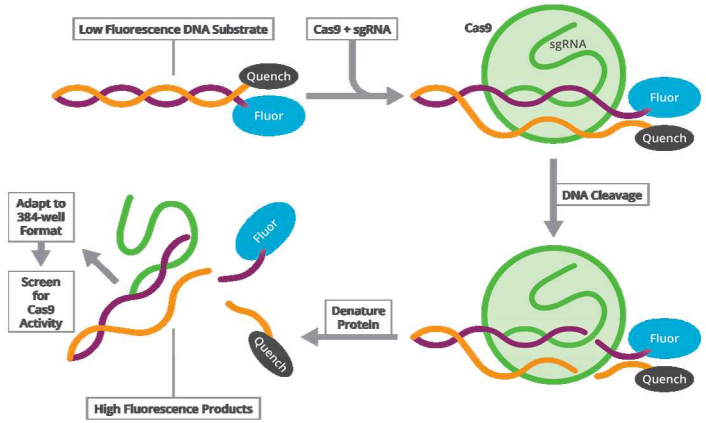
Currently identifying chemical and biological inhibitors using an integrated biological & computational approach PI: Brooke Harmon, LDRD

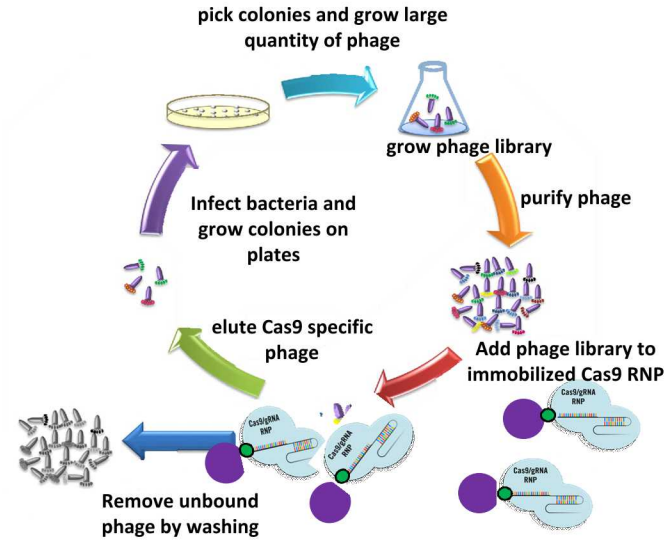
Optimizing delivery of Anti-CRISPR (Acr) proteins PI: Joe Schoeniger, DARPA SafeGenes

analytical chemistry Article
Cite This: Anal. Chem. 2018, 90, 6913−6921 pubs.acs.org/ac

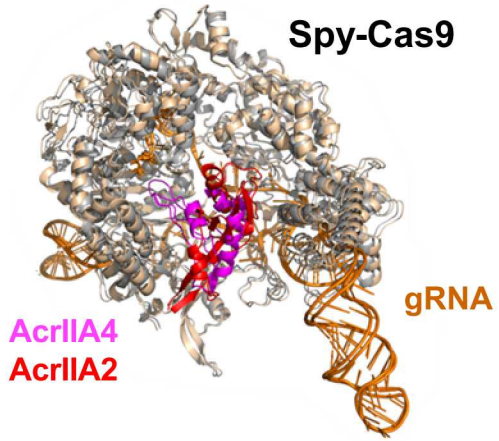
Versatile High-Throughput Fluorescence Assay for Monitoring Cas9 Activity

Kyle J. Seamon, Yooli K. Light, Edwin A. Saada, Joseph S. Schoeniger, and Brooke Harmon*



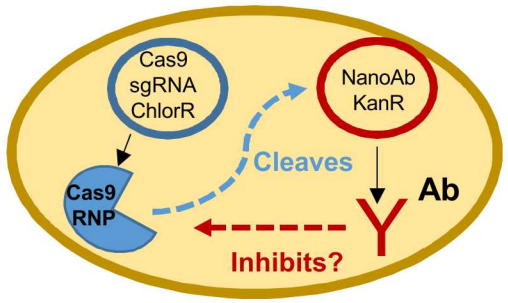


Naturally Occurring Anti-CRISPR Proteins

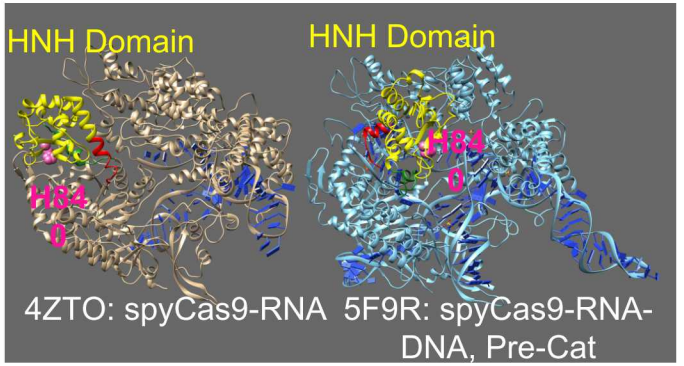


Anti-CRISPR (source)	Size (aa)	CRISPR inhibited	Species Inhibited
AcrIIA1 (LMO)	149	Type II-A	LMO
AcrIIA2 (LMO)	123	Type II-A	• LMO, Spy, • St1, Nme, Cje*
AcrIIA3 (LMO)	125	Type II-A	• LMO. • St1 Cas9, Nme, Cje*
AcrIIA4 (LMO)	87	Type II-A	LMO, Spy
AcrIIA5 (St)	140	Type II-A	• Spy, St1 & St3 • LMO, Nme, Cje*
AcrIIA6 (St1)	183	Type II-A	St1 in bacteria and mammalian cells
AcrIIC1 (Nme)	85	Type II-C	Nme, Cje
AcrIIC2 (Nme)	123	Type II-C	Nme
AcrIIC3 (Nme)	116	Type II-C	Nme

Dual Plasmid Survival Assay

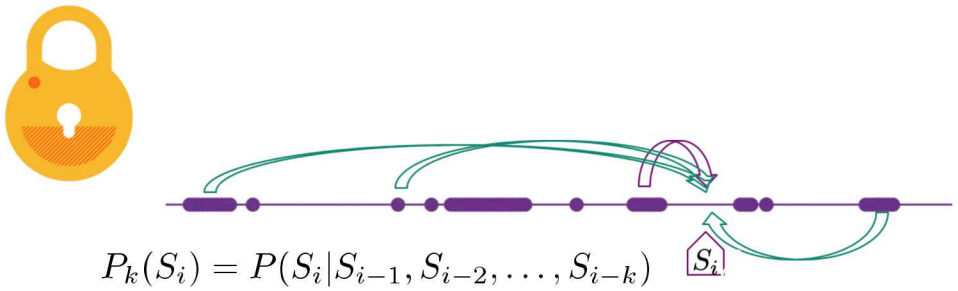


In Silico Screen: Targeting "Allosteric Transducers"

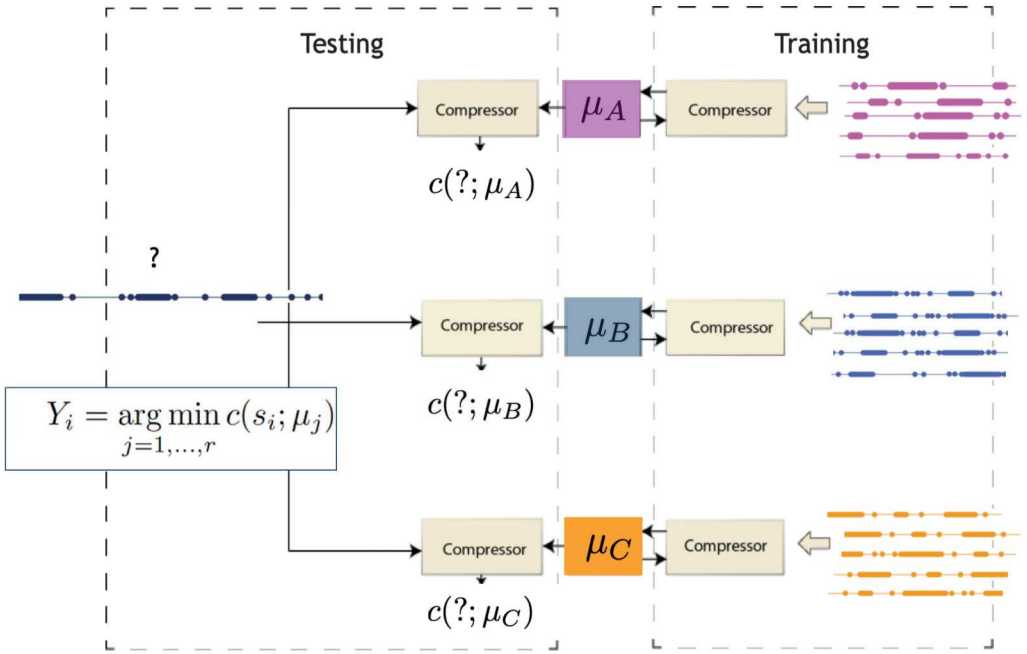


Reordering genomic information for enhanced inference via compression analytics PI: Christina Ting

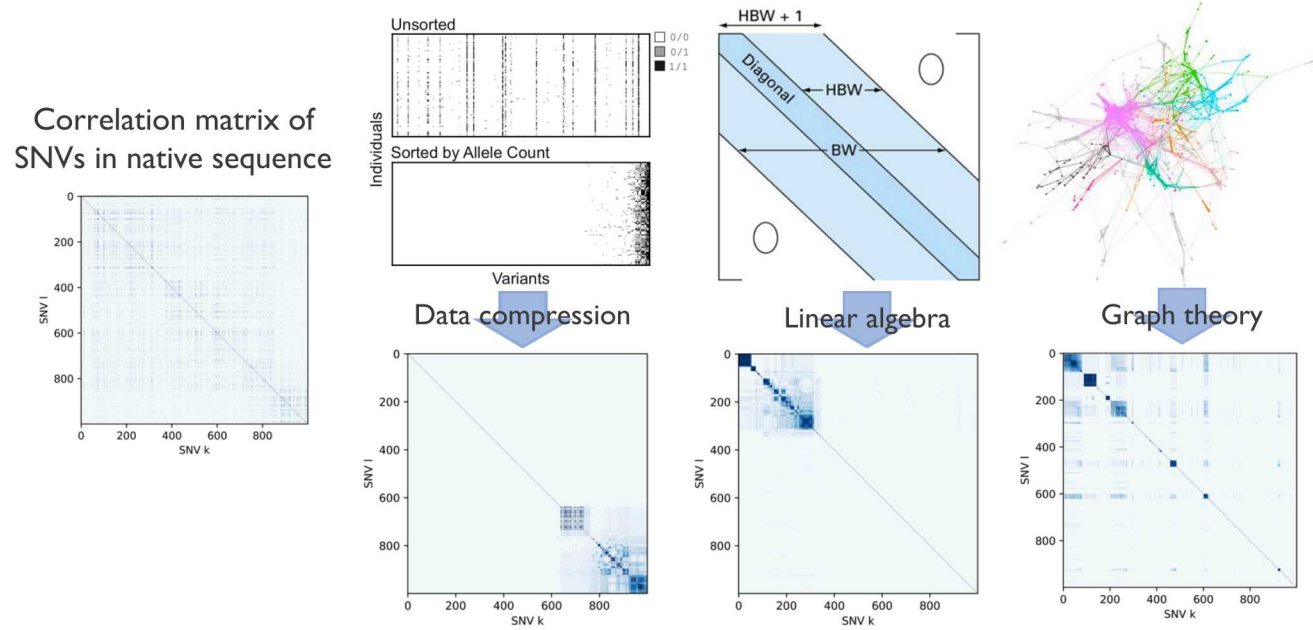
23andMe: "Privacy is in our DNA"



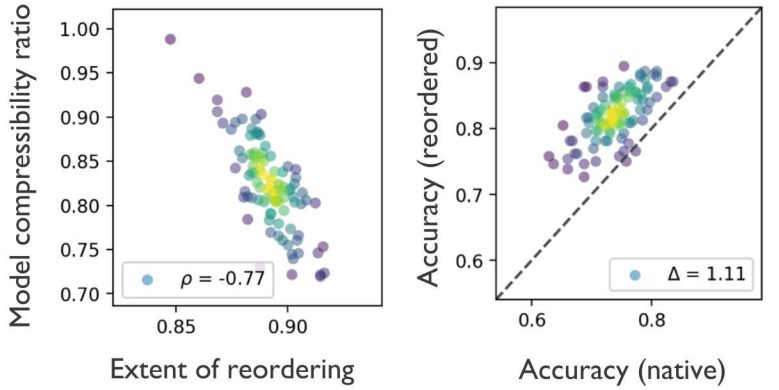
An information-based classification scheme



Reordering schemes



Classification Performance Metrics



Method	Accuracy	Δ
RF (Native)	0.67	–
RF (k-mer histogram, $k = 1$)	0.55	–
RF (k-mer histogram, $k = 10$)	0.68	–
Compression (Native)	0.74	–
Compression (Louvain)	0.81	1.10
Compression (RCM)	**0.82**	**1.11**
Compression (Allele Frequency)	0.79	1.06