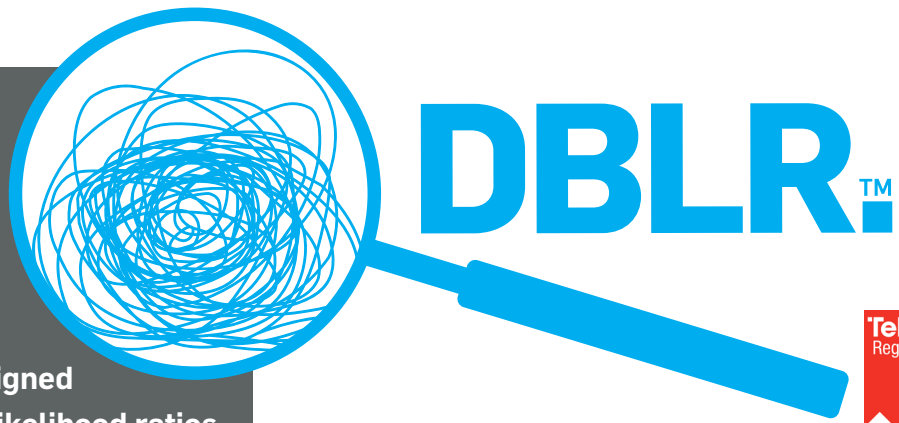


From the team
that brought
you STRmix™

DBLR™ (database likelihood ratios) is an application designed for the rapid calculation of likelihood ratios (LRs) using STRmix™ deconvolutions.



DBLR™



Quality ISO 9001

www.STRmix.com/dblr

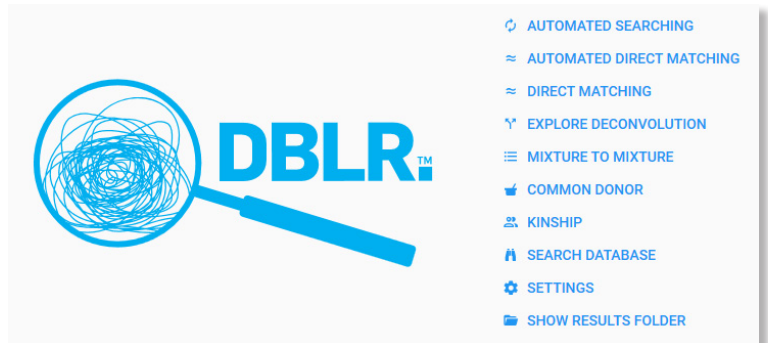
FAST DBLR™ calculates millions of LRs in seconds.

ACCESSIBLE DBLR™ runs on a user's PC, without the need for high-performance computing.

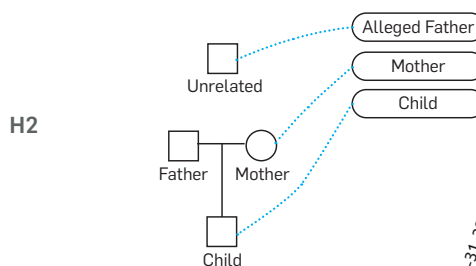
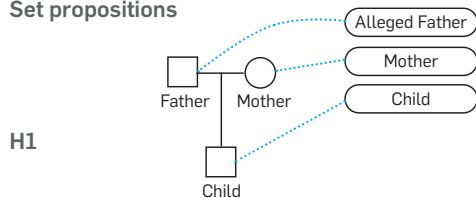
ENABLING DBLR™ enables you to get more value from your DNA evidence.

WITH DBLR™ YOU WILL BE ABLE TO:

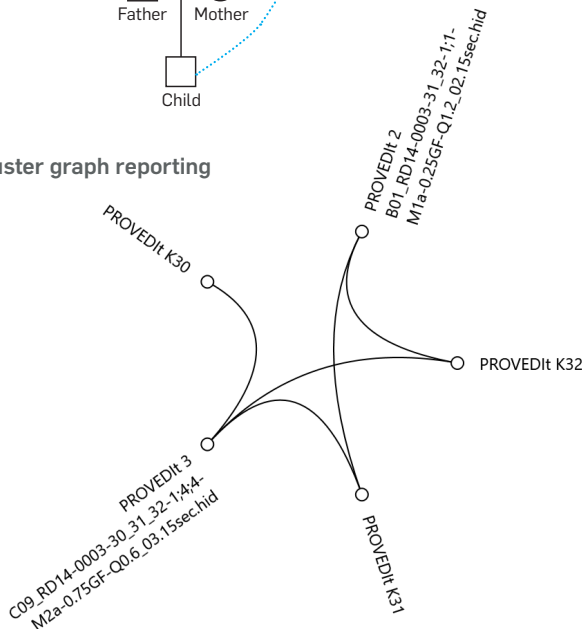
- Achieve superfast database searches.
- Visualise the value of your DNA mixture evidence.
- Undertake mixture to mixture matches.
- Determine whether there is a common donor between samples.
- Calculate any kinship relationship conceivable (now including modelling of linkage, mutation and F_{ST}).
- Assign Kinship LRs for single source NGS profiles.



Set propositions



Cluster graph reporting



WHAT CAN DBLR™ DO?

- **UNDERTAKE DIRECT COMPARISON** of one or many components of a forensic DNA mixture to a database of known individuals (i.e. "Who contributed to the profile?").
- **CARRY OUT FAMILIAL SEARCHING** for a range of different relationships including siblings, half-siblings, parents, and children (i.e. "Is there a relative of the donor in the database?").
- **SEARCH FOR COMMON CONTRIBUTORS** between mixed DNA profiles (mixture to mixture comparisons). These LRs can be visualised using a heat map, and now include cluster graphs (New in DBLR™ v1.2).
- **DETERMINE THE PROFILES** of the most likely contributors to a profile.
- **VISUALISE THE VALUE** of evidence by calculating expected LRs for one or many components of forensic DNA profiles for true and non-contributors using randomly generated individuals.
- **MANAGE AUTOMATED SEARCHES** for one or many DNA profiles against one or many databases of known individuals. Now includes direct matching between databases (New in DBLR™ v1.2).
- **MANAGE DATABASES** of known contributors and STRmix™ deconvolutions from unsolved casework for easy matching.
- **COMBINE MULTIPLE EVIDENCE PROFILES** under the assumption that there is a common contributor within the different samples (Common Donor).
- **BUILD ANY PEDIGREE** imaginable and calculate likelihood ratios given the different propositions (Kinship).
- **MODEL** linkage, mutation and F_{ST} in the Kinship module (New in DBLR™ v1.2).
- **ASSIGN LRs** within the Kinship module for single source profiles containing both STR and SNP loci generated using Next Generation Sequencing (NGS) technology (New in DBLR™ v1.2).
- **PROTECT YOUR SETTINGS** with a user defined password.

HOW DOES DBLR™ WORK?

DBLR™ uses efficient algorithms for the fast calculation of LR_s. With DBLR™ the user can import STRmix™ deconvolutions or single source-profiles and visualise the value of the evidence or carry out fast database searches. The DBLR™ Kinship function is both powerful and flexible. The user can load STRmix™ deconvolutions or single-source profiles from known individuals and link these with one or more pedigrees. The Common Donor function can better resolve the genotypes of queried contributors and search these against a database to identify possible donors.

VALIDATION

DBLR™ has been extensively validated by the STRmix™ team based at ESR, New Zealand.

SPECIFICATIONS

DBLR™ is designed to run standalone on an individual DNA analyst's PC. For guidance on hardware and software specifications please go to: www.strmix.com/dblr/specifications/

CERTIFICATION

The STRmix™ team's quality management system is certified to AS/NZS ISO 9001:2015 by Telarc.

PUBLISHED DATA

The following papers describe the mathematics, validation and application of DBLR™:

- [1] Slooten K. Identifying common donors in DNA mixtures, with applications to database searches. *Forensic Science International: Genetics* 2017;26:40-7.
- [2] Kruijver M, Bright J-A, Kelly H, Buckleton J. Exploring the probative value of mixed DNA profiles. *Forensic Science International: Genetics* 2019;41: 1-10.
- [3] Bright J-A, Taylor D, Kerr Z, Buckleton J, Kruijver M. The efficacy of DNA mixture to mixture matching. *Forensic Science International: Genetics* 2019;41: 64-71.
- [4] Taylor D, Rowe E, Kruijver M, Abarno D, Bright J-A, Buckleton J. Inter-sample contamination detection using mixture deconvolution comparison. *Forensic Science International: Genetics* 2019; 40: 160-167.
- [5] J.-A. Bright, M. Jones Dukes, S.N. Pugh, I.W. Evett, J.S. Buckleton, Applying calibration to LR_s produced by a DNA interpretation software. *Australian Journal of Forensic Sciences*. 2019; 1-7.
- [6] Taylor D, Kruijver M. Combining evidence across multiple mixed DNA profiles for improved resolution of a donor when a common contributor can be assumed. *Forensic Science International: Genetics* 2020; 49.
- [7] H. Kelly, Z. Kerr, K. Cheng, M. Kruijver, J.-A. Bright, Developmental validation of a software implementation of a flexible framework for the assignment of likelihood ratios for forensic investigations. *Forensic Science International: Reports*. 2021; Volume 4, 100231. <https://www.sciencedirect.com/science/article/pii/S2665910721000621?via%3Dihub> (external link)
- [8] M. Kruijver, D. Taylor, J.-A. Bright, Evaluating DNA evidence possibly involving multiple (mixed) samples, common donors and related contributors, *Forensic Science International: Genetics*. 2021; 54 <https://doi.org/10.1016/j.fsigen.2021.102532>

CONTACT: For more information about DBLR™ or for a quote please contact:

North/South/Central America Distributor:

Vic Meles

NicheVision Inc.

E: vic@nichevision.com

T: +1-866-840-3758 (US Only)

UK/Europe/Rest of World:

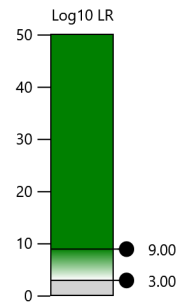
Adam McCarthy

T: +44(0)7590 405 501

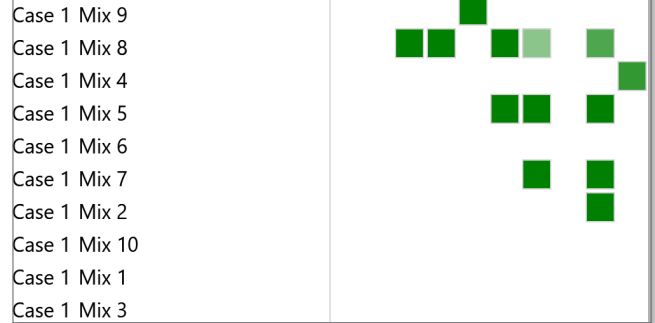
E: Adam.Mccarthy@esr.cri.nz

Heat map visualisation

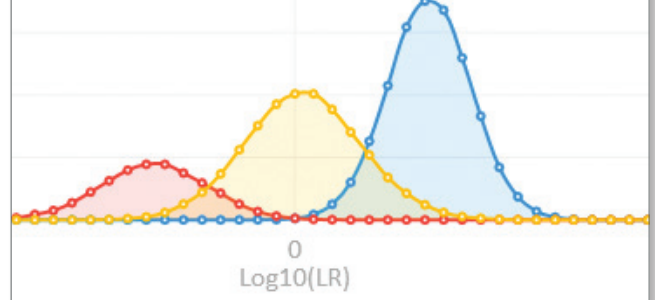
LRs for 1 common contributor



Case 1 Mix 9
Case 1 Mix 8
Case 1 Mix 4
Case 1 Mix 5
Case 1 Mix 6
Case 1 Mix 7
Case 1 Mix 2
Case 1 Mix 10
Case 1 Mix 1
Case 1 Mix 3



Visualise the value of the evidence



ID	Search Name	Profile Database	# Deconvolutions	# Matches	Date Matched
19	GlobalFiler threshold 1	GF 1 million	1	22	31/01/2019 1:50
Displaying 22/22 matches					
Previous Matches	Deconvolution	Reference ID1	Reference ID2	LR	Log10 LR
>	686	L1, K46K47K48_41	Random	77928	1.68308E+001
>	686	L1, K46K47K48_41	Random	78542	2.03703E+001
>	686	L1, K46K47K48_41	Random	112939	5.96656E+001
>	686	L1, K46K47K48_41	Random	156729	2.97958E+001
>	686	L1, K46K47K48_41	Random	221816	1.84802E+001
>	686	L1, K46K47K48_41	Random	298966	1.78186E+003
>	686	L1, K46K47K48_41	Random	307761	7.08068E+001
>	686	L1, K46K47K48_41	Random	333865	3.67859E+001
>	686	L1, K46K47K48_41	Random	345310	9.72803E+001
>	686	L1, K46K47K48_41	Random	377855	2.73390E+002
>	686	L1, K46K47K48_41	Random	507282	1.60982E+001
>	686	L1, K46K47K48_41	Random	527988	7.70232E+002
>	686	L1, K46K47K48_41	Random	555839	4.74342E+001
>	686	L1, K46K47K48_41	Random	602117	3.18974E+001
>	686	L1, K46K47K48_41	Random	609528	4.18578E+002

INSTITUTE OF ENVIRONMENTAL SCIENCE AND RESEARCH (ESR)

ESR is New Zealand's Crown Research Institute specialising in science for communities. ESR uses world-leading science to safeguard our health, keep our communities safer, protect our food-based economy, and improve the health of our water and natural environment.

FORENSIC SCIENCE SA (FSSA)

FSSA provides services to some of South Australia's largest government departments and undertakes award-winning research in forensic science.

STRMIX LIMITED

STRmix Limited is a subsidiary of ESR, founded to better serve international users of STRmix™.