National Fair Housing Alliance

2022
Tech Equity Initiative
Impact Statement

NFHA

About the Tech Equity Initiative

The Tech Equity Initiative (TEI) is a multi-faceted effort based on five main goals to eliminate tech bias and create a fair housing and lending marketplace.

Every day, housing providers, insurers, financial institutions, and other players use algorithms to make mortgage lending, insurance, tenant screening, and other decisions that have disproportionately negative impacts on underserved groups, including Black, Latino, Native, Hawaiian, Pacific Islander, and multi-ethnic people, as well as women and people with disabilities. Consumers have no clear process to challenge inaccuracies, identify and address perceived and real biases, or seek explanations when their mortgage or rental applications are decided by algorithms.

According to researchers,[1] mortgage lenders were 80 percent more likely to deny Black applicants, 40 percent more likely to deny Latino applicants, 70 percent more likely to deny Native American applicants, and 50 percent more likely to deny Asian/Pacific Islander applicants than their White counterparts. Moreover, 90 percent of landlords use tenant screening algorithms to review and score prospective tenants even though these systems can perpetuate bias.[2] Each year, Black and Latino borrowers pay $765 million more than they should, due to discriminatory statistical or Machine Learning (ML) mortgage pricing algorithms.

This represents 11.5 percent of mortgage lenders' "average profit per loan."[3] Biased tech contributes to racial wealth gaps, creates impediments to homeownership, makes the cost of housing less affordable for affected groups, and can cause displacement and homelessness.

The TEI is one of the programs operated by the National Fair Housing Alliance (NFHA), a national nonprofit organization fighting to eliminate all forms of housing discrimination and ensure equitable opportunities for all people. NFHA is also the trade association for fair housing groups throughout the nation. With over 170 member organizations, we are working to create a nation where everyone benefits from fair housing opportunities and every neighborhood is replete with the amenities and resources we all need to thrive.

NFHA's programs include:

Education & Outreach	Housing & Community Development
Consulting & Compliance	Tech Equity Initiative
Policy & Advocacy	Enforcement

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[1] Martinez, E. and Kirchner, L. (2021, August 25), The Secret Bias Hidden in Mortgage-Approval Algorithms, https://themarkup.org/denied/2021/08/25/the-secret-bias-hidden-in-mortgage-approval-algorithms.
[2] Kirchner, L. (2020, September 24). Can Algorithms Violate Fair Housing Laws? The Markup. https://themarkup.org/locked-out/2020/09/24/fair-housing-laws-algorithms-tenant-screenings.
[3] Bartlett, R. et al. (November 2019), Consumer-Lending Discrimination in the FinTech Era, http://faculty.haas.berkeley.edu/morse/research/papers/discrim.pdf?_ga=2.154679614.781032725.1667761872-1353433160.1667761872.
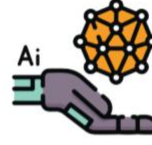
Our Goals

Develop solutions to remove bias from the technologies that impact our lives.	Increase transparency and explainability for AI tools.	Advance research to reduce bias in tech.	Develop policies that promote more effective oversight for AI tools.	Support efforts to increase diversity, equity and inclusion in the tech field.

By the Numbers

40 Million unique records transferred to NFHA's uniquely built data management platform

22,020 reached by Tech Equity advocacy work

10,000 Accessed the **Frontdoor** web-based service that connects renters to Emergency Rental Assistance Programs

667 people accessed ERAP receiving an average of $5K in cash assistance

14,638 unique visitors to TEI web pages to access materials and resources

6,560 users accessed an AI Fair Lending Policy Agenda, published by Brookings Institution
The paper was downloaded 337 times

By the Numbers

568 people accessed Purpose, Process, and Monitoring, NFHA's State-of-the-Art framework for auditing algorithmic systems in housing and finance

8 Publications and Comment Letters including a comprehensive response to federal regulator's RFI on AI and Machine Learning that has been used by over 300 organizations

9 training sessions and workshops attended by more than 2,700 people

9 open-source fairness tools analyzed and tested

5 new infrastructures or systems built

Lisa Rice

President & CEO
National Fair Housing Alliance

Technology is the new civil rights frontier. While it may hold many promises for helping people and communities, it also runs the risk of further entrenching longstanding inequities in our nation's housing and financial markets. That's why, through our Tech Equity Initiative, NFHA is working to eliminate bias in algorithmic systems and make the tech industry fairer and more inclusive. It is imperative that we move closer to achieving an AI infrastructure that centers consumers and benefits the whole economy. We look forward to working closely with our partners in communities throughout the country, regulators, advocates, and tech experts to create responsible technological systems."

Michael Akinwumi, PhD

Chief Tech Equity Officer
National Fair Housing Alliance

Technologies used in housing and financial services impact every area of people's lives, from whether someone can get a loan to whether a sick patient can get necessary healthcare. Unfortunately, many algorithmic systems are not fair to women and people of color. The goal of NFHA's Tech Equity Initiative is to eliminate biases that are often found in AI, particularly in the housing and mortgage lending sectors. We are developing technical solutions, policy recommendations, and other solutions to help regulators, businesses, and other stakeholders implement transparency, explainability, fairness, and accountability in AI tools."

Solutions

NFHA worked with other advocates to establish and secure funding for the Emergency Rental Assistance Program to keep people housed during the COVID pandemic. The Consolidated Appropriations Act (CARES Act), passed on December 27, 2020, and the American Rescue Plan Act (ARP Act), passed on March 11, 2021, provided more than $46 billion in emergency rental assistance. People who desperately needed funds found it difficult to search for eligible programs and obtain assistance. NFHA created Frontdoor as a "tech for good" web service to assist struggling renters.

NFHA's Tech Equity team developed a variety of solutions for creating responsible technologies that benefit consumers. These include Frontdoor, an interactive web service developed to assist tenants who are seeking assistance through rental assistance programs, including the Emergency Rental Assistance Program administered by the Treasury Department. Frontdoor helps significantly shorten the application process by connecting tenants with programs for which they are eligible and helping them prepare the paperwork they need in order to apply for assistance. Since its launch in March 2022, more than **10,000 users have visited the Frontdoor web service site. Approximately 667 people have used Frontdoor to access cash emergency assistance, with each receiving an average amount of $5,000.** Frontdoor is also award-winning, placing second in the CFPB Open Data for Good Grand Challenge in the Health and COVID-19 category.

The Tech Equity team also developed a Natural Language Processing (NLP) recommendation system to comb large amounts of data from social media platforms. This new system allows us to ingest and analyze data and uses Artificial Intelligence (AI) to make informed decisions. We are using this system to help increase NFHA's outreach, organizing, and advocacy goals. This tool **is projected to increase NFHA's membership base by 15 percent.**

The team also finished the design and architecture for a debiasing toolkit that will feature fairness methodologies for algorithmic solutions in housing and lending. The debiasing toolkit will be fully completed in 2023. Our analysis reveals that there are currently about 30 publicly available fairness techniques. **The toolkit is expected to drive competition among solution developers and lead to a 5–10 percent annual increase in fairness techniques over the next five years.**

In all, we built five new infrastructures or systems to provide critical services to consumers; tackle discrimination; process, protect, and analyze large data sets; and reduce bias in algorithmic models. In addition to the Frontdoor web service and NLP recommendation system described above, the TEI team built three additional systems which include:

- A new data pipeline infrastructure to transfer large amounts of data from one source to another. This new pipeline allows us to ingest and analyze big data sets such as Home Mortgage Disclosure Act data or Census data to our own data warehouses.

- A system for extracting and parsing text from PDF documents to assist with NFHA's enforcement efforts. The system uses an ML-driven approach to extract text from hundreds of thousands of documents we received during litigation discovery. The development of the system required a lot of diligence and experience with ML techniques to perform the function effectively and accurately.

- A system to assist the Enforcement team in combing through web-based real estate platforms to identify potential violations of federal and state fair housing laws. This system exponentially reduces the time needed for investigation teams to review and analyze critical data.

Transparency and Explainability

The Tech Equity team created a new state-of-the-art, comprehensive framework for auditing systems like credit scoring, insurance scoring, automated underwriting, risk-based pricing, digital advertising, and tenant screening tools. This framework, called **Purpose, Process, and Monitoring** (PPM), provides a roadmap for various stakeholders to assess the fairness and efficacy of algorithmic systems they develop and operate and to lessen the harmful effects of these systems on our society.

The PPM framework has generated unprecedented interest and is an important tool to expand access to credit and eliminate barriers to homeownership nationally. The PPM framework webpage has been visited over 568 times, and the **framework itself has been downloaded more than 300 times.** Additionally, the team hosted two webinars featuring the PPM framework in which 265 attendees participated. The PPM framework is now being used by the Ohio State Government to help officials ensure systems owned, developed, and operated by the state are responsible. The TEI team also used the framework to audit an Automated Valuation Model (AVM) used to appraise homes. Additionally, the TEI team is using PPM to audit an AI model that infers age and gender from images. Based on the high level of interest in PPM, we expect it will be used for a variety of third-party algorithmic audits.

The TEI team also formed a coalition to exchange ideas regarding best practices for creating transparent, more explainable, and fairer AI/ML models as well as facilitating critical discussions about equitable policies in housing and lending. The coalition is called GATES (Group Acting for Tech Equity Systems) and will launch in 2023. It will be comprised of researchers, data scientists, engineers, policymakers, civil rights and consumer protection experts, and finance and housing industry professionals. As a result of GATES, NFHA will participate in the production of at least three publications each year to advance the goals of the TEI.

Research

NFHA's Chief Tech Equity Officer, Dr. Akinwumi, led novel research to compare popular fairness toolkits—designed to limit bias in algorithmic systems—to understand their strengths and limitations as well as their applicability to housing and lending contexts. .

| Tool	Owner	Scope	Language
What-If	Google	Diagnostic	Python, HTML
AI Fairness 360	IBM	Diagnostic and Debiasing*	Python, R
Fairlearn	Microsoft	Diagnostic and Debiasing*	Python
scikit-fairness		Diagnostic*	Python
ML-fairness-gym	Google	Diagnostic	Python
fairness		Diagnostic	R
LiFT	LinkedIn	Diagnostic	Scala
Algofairness		Diagnostic	Python
Aequitas		Diagnostic	Python

We reviewed nine different open-source tools and ultimately conducted in-depth research and analysis on three—**IBM's AI Fairness 360**, **Microsoft's Fairlearn**, and **scikit-fairness**. These three fairness tools were selected based on their scope, ease of use, suite of algorithms covered, and community support. We used Home Mortgage Disclosure Act (HMDA) data to evaluate some of the algorithmic fairness techniques. Key findings from our research include:

- The tools evaluated included fairness metrics which provide different ways for model developers to determine if their systems meet various fairness standards;
- The tools included ways to search for Less Discriminatory Alternatives (LDAs) to help users identify different approaches to increase fairer outcomes;
- Each tool could only handle one single objective, like reducing bias for a particular group;
- None of the tools could handle multi-faceted objectives, such as increasing fairness for multiple groups simultaneously or reducing bias for a particular group while simultaneously increasing model accuracy;
- None of the tools incorporated disparate impact—arguably the best approach for gauging discrimination—as a fairness measure; and
- Without proactively correcting for bias, a basic model will reflect existing biases contained in the data including unfair mortgage denial rates for underserved groups.

We are collaborating with stakeholders to conduct further research on new techniques that may hold greater potential for reducing bias in data-driven models. The team's goal is to identify a technique that can be optimized for multiple objectives, such as reducing bias against protected groups **and** increasing model accuracy. To that end, NFHA received a major data grant from one of the world's largest data providers containing mortgage origination and performance data for millions of consumers. The team **successfully built a data management and research platform**

and uploaded 40 million unique records onto the new system enabling the team to test and conduct more groundbreaking research of algorithmic fairness tools.

The Tech Equity Team also participated in the FinRegLab's Advisory Board and Policy Working Group to review and provide extensive feedback on research projects conducted by the organization.
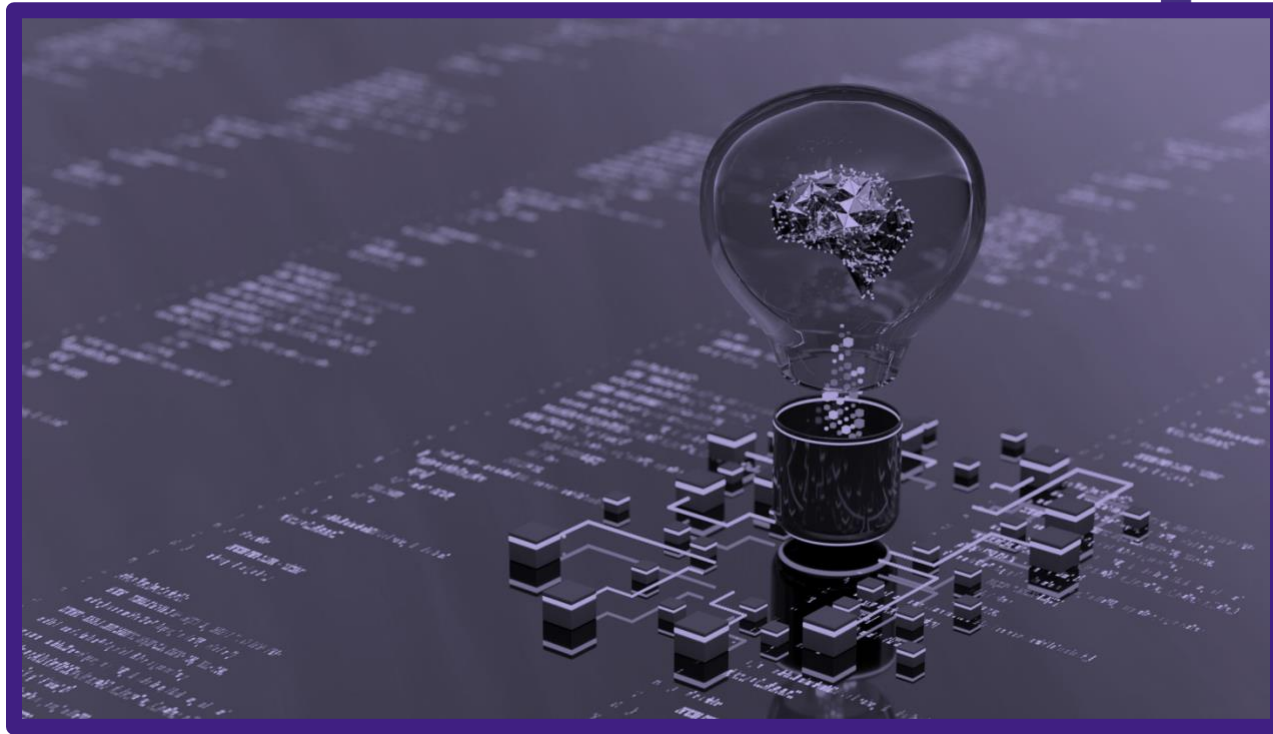
Policy

Through our advocacy and outreach work, we were able to create a robust body of policy prescriptions beginning with our Policy Roadmap[4] for the 117th Congress. With 66 percent of our administrative policy recommendations implemented, this roadmap has proven to be instrumental in guiding the Biden Administration's work to advance equity in technology, housing, lending, and other areas. Since launching the TEI, we have developed **eight publications** and comment letters to advance fairness, equity, accountability, transparency, explainability, and ethical technologies. We have also written articles or been featured in articles appearing in high-profile publications including MIT Technology Review, AIAndYou, Forbes, and the New York Times.

NFHA played a primary role in writing a comprehensive response to the federal regulators' Request for Information and Comment on the use of AI and ML in financial services.[5] Our detailed comment covered four broad areas including the use of AI by financial institutions; appropriate governance, risk management, and controls; challenges in developing, adopting, and managing AI systems; and clarifications to assist federal regulators. The comment, which was signed by 44 national and regional organizations, has been used by over 300 agencies at the federal, state, and local levels to formulate policies and procedures involving AI and ML systems.

We also collaborated with Kareem Saleh and Dr. John Merrill of FairPlay-AI to co-author a paper, published by The Brookings Institution, that laid out a policy agenda for federal regulators. The paper, which has been **viewed more than 6,560 times and downloaded more than 337 times**, focuses on how algorithmic systems can generate disparities and harmful outcomes for underserved groups, such as people of color and women. It also proposes policy and enforcement steps regulators can take to ensure AI and ML models are non-discriminatory and benefit consumers and communities.

In addition to creating policy solutions, we have been called upon to provide education and support for Members of Congress, including testifying before the House Financial Services Committee's Tech and AI Fairness Task Force on ways to increase tech equity.[6]

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[4] *See*, Expanding Housing and Racial Equity, Community Stability, and Economic Security: A Map for the Biden Administration and the 177th Congress, February 3, 2021, National Fair Housing Alliance. https://nationalfairhousing.org/wp-content/uploads/2021/09/NFHA-Priorities-for-Biden-Administration-and-117th-Congress-2021.02.03-1-9.pdf

[5] *See*, comment in response to federal regulators' Request for Information and Comment on Financial Institutions' Use of Artificial Intelligence, including Machine Learning, https://nationalfairhousing.org/wp-content/uploads/2021/12/Federal-Banking-Regulator-RFI-re-AI_Advocate-Letter_FINAL_2021-07-01.pdf

[6] *See*, Equitable Algorithms: How Human-Centered AI Can Address Systemic Racism and Racial Justice in Housing and Financial Services, Testimony of Lisa Rice, President and CEO of the National Fair Housing Alliance, before the House Financial Services Task Force on Artificial Intelligence's hearing. https://nationalfairhousing.org/wp-content/uploads/2022/07/Rice-Congressional-Testimony_Equitable-Algorithms.pdf

Policy Papers, Comments, and Congressional Testimony

1. Response to the Consumer Financial Protection Bureau's Request for Information on the Equal Credit Opportunity Act and Regulation B
2. Policy paper entitled, An AI Fair Lending Policy Agenda for the Federal Financial Regulators, published by The Brookings Institution
3. Response to the Office of Science and Technology Policy's Request for Information on Public and Private Sector Uses of Biometric Technologies
4. Response to the Federal Regulators' Request for Information and Comment on Financial Institutions' Use of Artificial Intelligence, including Machine Learning
5. Response to the National Institute of Standards and Technology's Risk Management Framework for AI
6. Technical response to the National Institute of Standards and Technology's Risk Management Framework for AI
7. Response to the Federal Housing Finance Agency's Request for Information on the Roles of Fintechs in Housing Finance
8. Testimony for the House Financial Services Task Force on Artificial Intelligence's Hearing entitled Equitable Algorithms: How Human-Centered AI Can Address Systemic Racism and Racial Justice in Housing and Financial Services

Diversity, Equity, and Inclusion

Our years of experience in contributing to the development and improvement of algorithmic systems has shown us that a diverse and inclusive team of AI or Machine Learning creators, executors, and operators will lead to responsible solutions that benefit consumers. Our experience is consistent with studies that show that diversity can increase innovation and decision-making by stimulating critical analysis and deeper information processing.[7]

We started, of course, at home, building a Tech Equity team that is very diverse. Diversity within the tech industry is paltry at best with Blacks and Latinos only representing 7 percent and 8 percent of the workforce, respectively.[8] We are proud that NFHA's Tech Equity team is one of the most diverse in the industry. We undertook a very broad-based search for someone to head up the Tech Equity Initiative, and we were deliberate about securing a Chief Tech Equity Officer who fully believed in this goal. The team is headed by Dr. Michael Akinwumi, one of the world's leading data scientists. Dr. Akinwumi immediately established an internship program bringing on three young people of color to work on the Tech Equity team and serve as their mentor. All three were ultimately hired to work on the program.

Tech Equity Team Stats

43% Female
29% Asian
43% Black

Because our team is so diverse — 43 percent women and 71 percent people of color — when members participate in activities in the field, they lend to the diversity within the larger group. For example, three members of the Tech Equity team participated in prestigious academic programs the at Oxford University in England and the Summer School on the Law, Ethics and Policy of Artificial Intelligence at KU Leuven University in Belgium. The presence of our staff participating in these opportunities added to the diversity of the programs, enriched the content covered during the sessions, and added extra dimensions to the learning experiences of the other students. NFHA team members were able to share concepts about equity, fairness, transparency, explainability, and accountability in tech solutions that other program participants had not explored.

Furthermore, the PPM framework referenced above has a section that audits the diversity of the creators, executors, and operators of AI solutions across, for example, their educational credentials, age, gender, and racial groups.

Our focus on inclusion has led to engagements with financial institutions—one of the four largest banks in America has expressed an interest in partnering with us to diversify its modeling team.

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[7] Galinsky, A. et al. (2015, November 17), Maximizing the Gains and Minimizing the Pains of Diversity: A Policy Perspective, https://journals.sagepub.com/doi/full/10.1177/1745691615598513

[8] Kennedy, B. et al. (2021, April 14), 6 Facts about America's STEM Workforce and Those Training for It, https://www.pewresearch.org/fact-tank/2021/04/14/6-facts-about-americas-stem-workforce-and-those-training-for-it/

Increasing the participation of people of color will require commitment and intentionality. Including issues of equity and inclusion in the conversations, research, and work people in the technology field are undertaking each day will take deliberate focus. These things will not happen by chance. In our future work, we will be hosting tech challenges, hackathons, and engaging in partnerships with a range of organizations to continue the important work of increasing diversity, equity, and inclusion in the tech field.
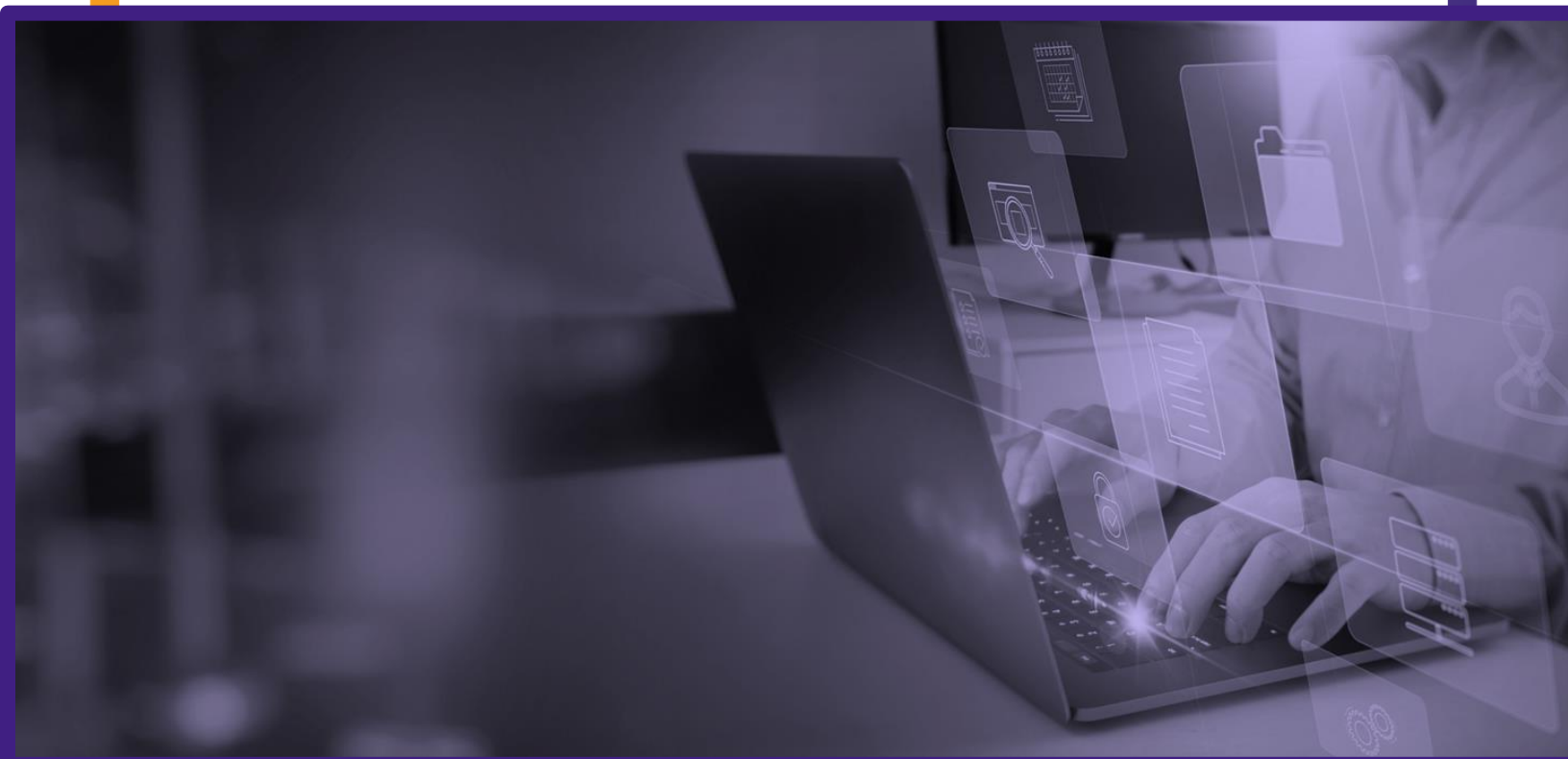
Looking Ahead

It will take intentionality to overcome inequity. Given the exponential growth in the use of AI in the housing and financial services space, one of the surest ways to make algorithmic solutions responsible and to reduce disparities is to manage, mitigate, and govern consumer risks, not only model risks, associated with tech. It is imperative that we make systems fairer; increase transparency and explainability for algorithmic tools, including AI products; develop ethical standards for responsible technology; promote policies that generate fairer outcomes; and increase diversity, equity, and inclusion in the tech field.

The Tech Equity Initiative aims to achieve the following outcomes when its objectives are realized:

- Reduce the disparity in mortgage loan denial rates for people of color from its current range of 40–80 percent[9] to 10–20 percent, compared to their White counterparts.
- Reduce the pricing differentials for Black and Latino borrowers from its current range of 5.6–8.63 basis points to below 2 basis points on purchase loans compared to White and Asian borrowers.
- Return the majority of the 11–17 percent3 higher corporate profits on purchase loans to people of color.

Led by our President and CEO, Lisa Rice—one of the nation's leading experts on racial equity and fair housing, and Chief Tech Equity Officer, Dr. Michael Akinwumi—one of the foremost academics and thought leaders in the responsible AI field, we are poised to realize our goals. They are supported in this work by a data scientist, a data engineer, a cloud developer, and two tech analysts, all dedicated to reducing bias in systems that perpetuate inequity. The initiative has external collaborators and cross-functional collaborations with NFHA's other divisions including Housing and Community Development, Legal, Education and Outreach, Policy and Advocacy, Member Services, Communications, and general administration to help advance the TEI's ambitious goals.

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[9] Martinez, E., and Kirchner, L. (August 25, 2021), The Secret Bias Hidden in Mortgage-Approval Algorithms, https://themarkup.org/denied/2021/08/25/the-secret-bias-hidden-in-mortgage-approval-algorithms

Partners

Sponsors:

External Collaborators: